Telephony®

THE JOURNAL OF THE TELEPHONE INDUSTRY

TELEPHONE UP A TREE

High up Waikiki banyan tree, above personable Shirley Scott, business office supervisor of the Hawaiian Telephone Co., Honolulu, is suspended the Hal Lewis radio-TV studio, where the company installed a telephone and teletypewriter.

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FLASHES AND PLUGS

THE BIRD HAD FLOWN! A social worker in a mental hygiene clinic telephoned to a number given her by an applicant asking for a first appointment. At the other end of the line, a man answered, and said he'd get the party being called.

The man was gone from the telephone for a long time. When he returned, he announced, perhaps, a bit concerned, "I'm sorry, I can't find her—she's out of her cage."

Jolted by this news, the social worker wondered if she had gotten in touch with the bird house at the zoo until she found that the applicant worked as a teller in a bank.

•

BANDITS BE-CALMED BY CUSTOMERS. *The American Banker* in a story published Feb. 26, reports that when three gun-toting bandits strode into the People's Bank of Bessemer, Pa., and yelled "Stickup!" they encountered an unusual reaction from both customers and tellers.

The tellers merely grinned at each other, and showed no signs of panic. One teller calmly dialed the police on the telephone.

With their trigger fingers evidently frozen as they watched this baffling scene, the robbers, open-mouthed, listened to the telephone conversation.

A calm customer explained to the foiled bandits, "This bank is holdup proof. That's bullet-proof glass, and you can't get inside the tellers' cages."

It was the customers' and tellers' turn to be baffled, then, for the bandits simply shrugged their shoulders, and walked lootless out the door.

•

ROCKET ROUTE. The applicant for a mail carrier's job was being tested and interviewed.

"Young man," the interviewer inquired, "how far is it from the earth to the moon?"

"I don't really know," the prospect stammered, "but if that's the only route open, I don't want the job."

•

NON-SCHEDULED START. An Australian newspaper reports that recently a man called a taxi company and complained that a cab he ordered to take him to the Kingsford-Smith airport had not arrived.

The girl who took the call apologized. "I'm very sorry the cab isn't there yet, sir," she said. "But don't worry. The plane is always late."

"Well, it certainly will be this morning," the caller said sharply. "I happen to be the pilot."

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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

March 26, 1960

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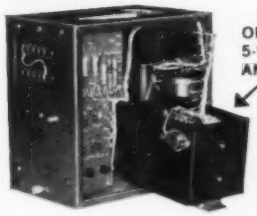

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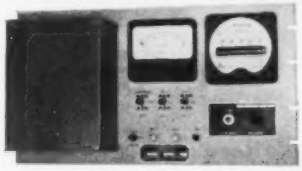

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Write for Bulletin 177A

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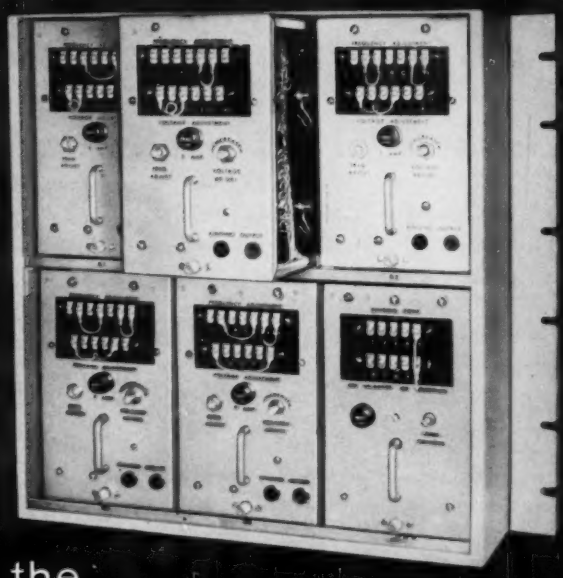

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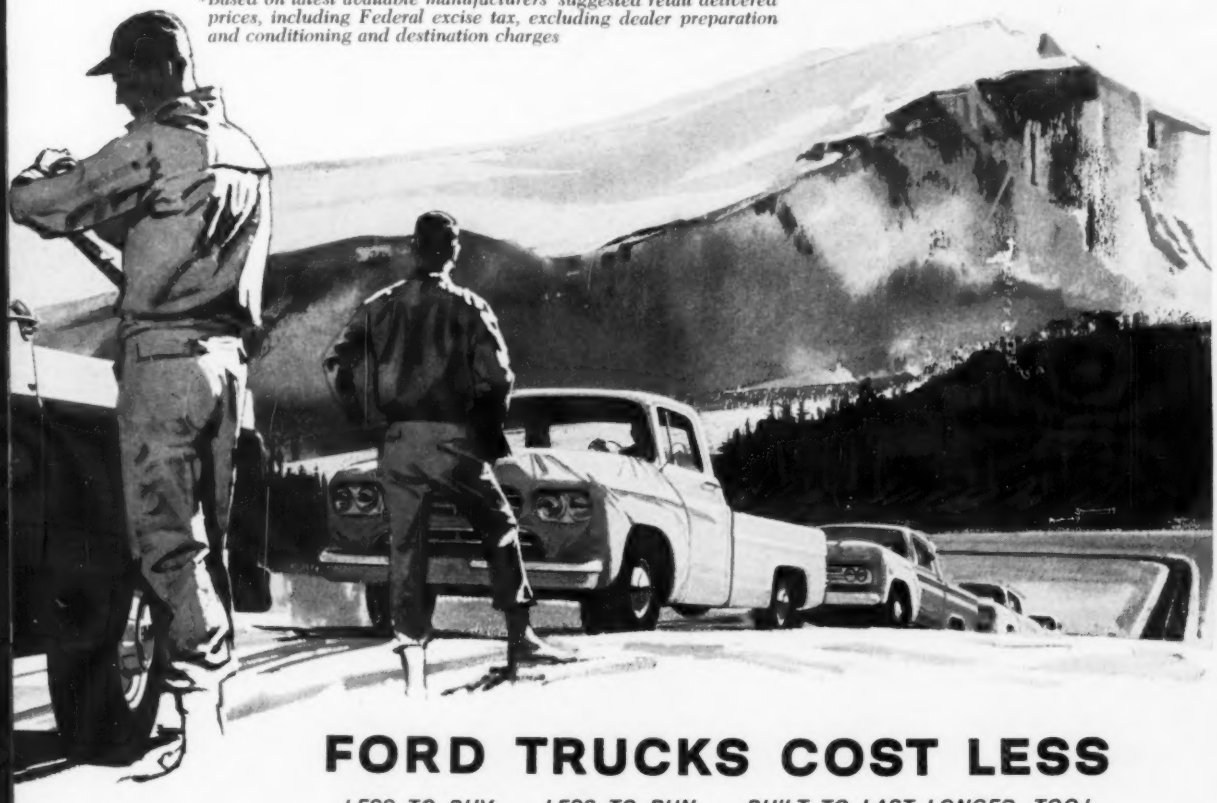

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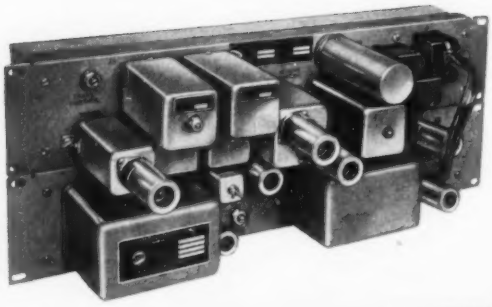

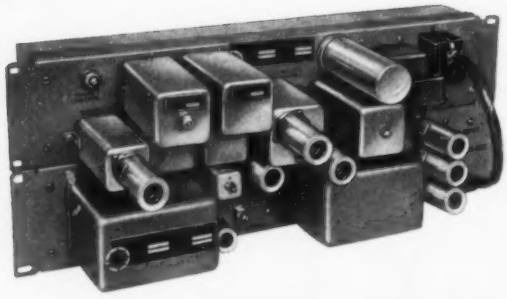

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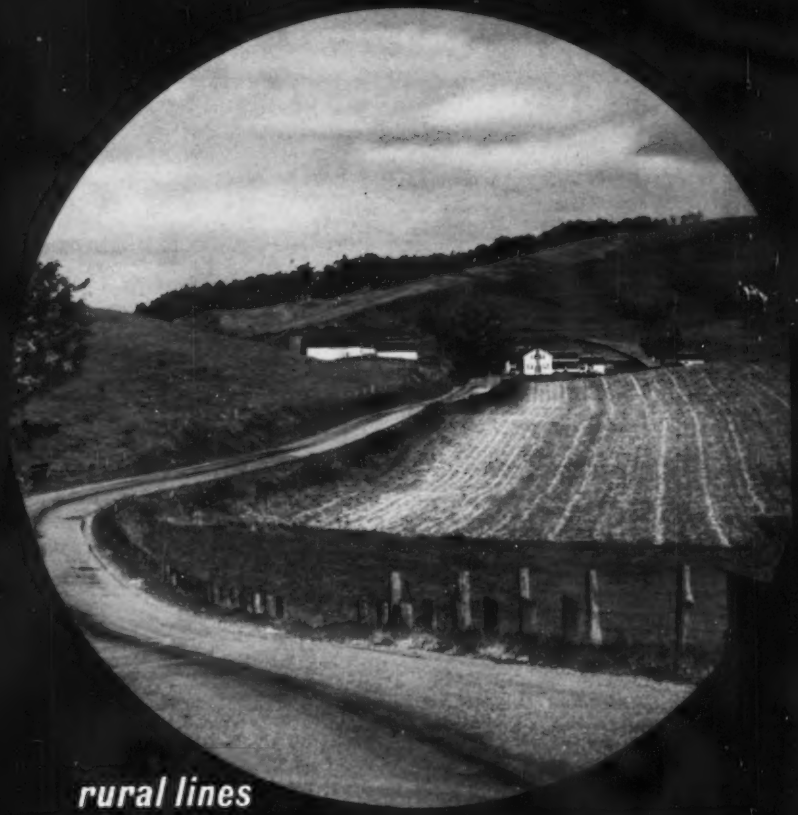

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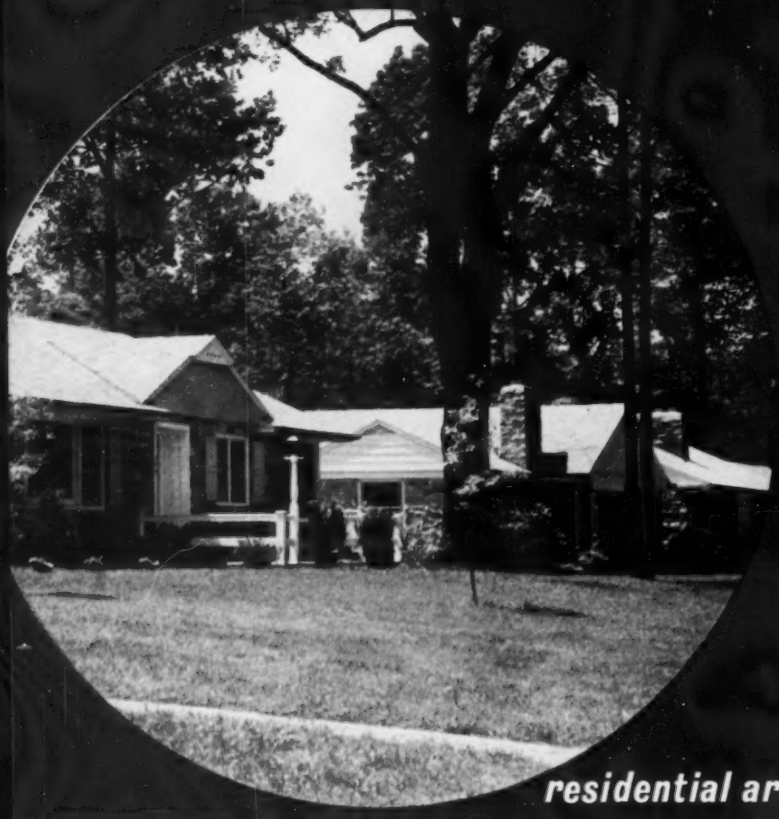

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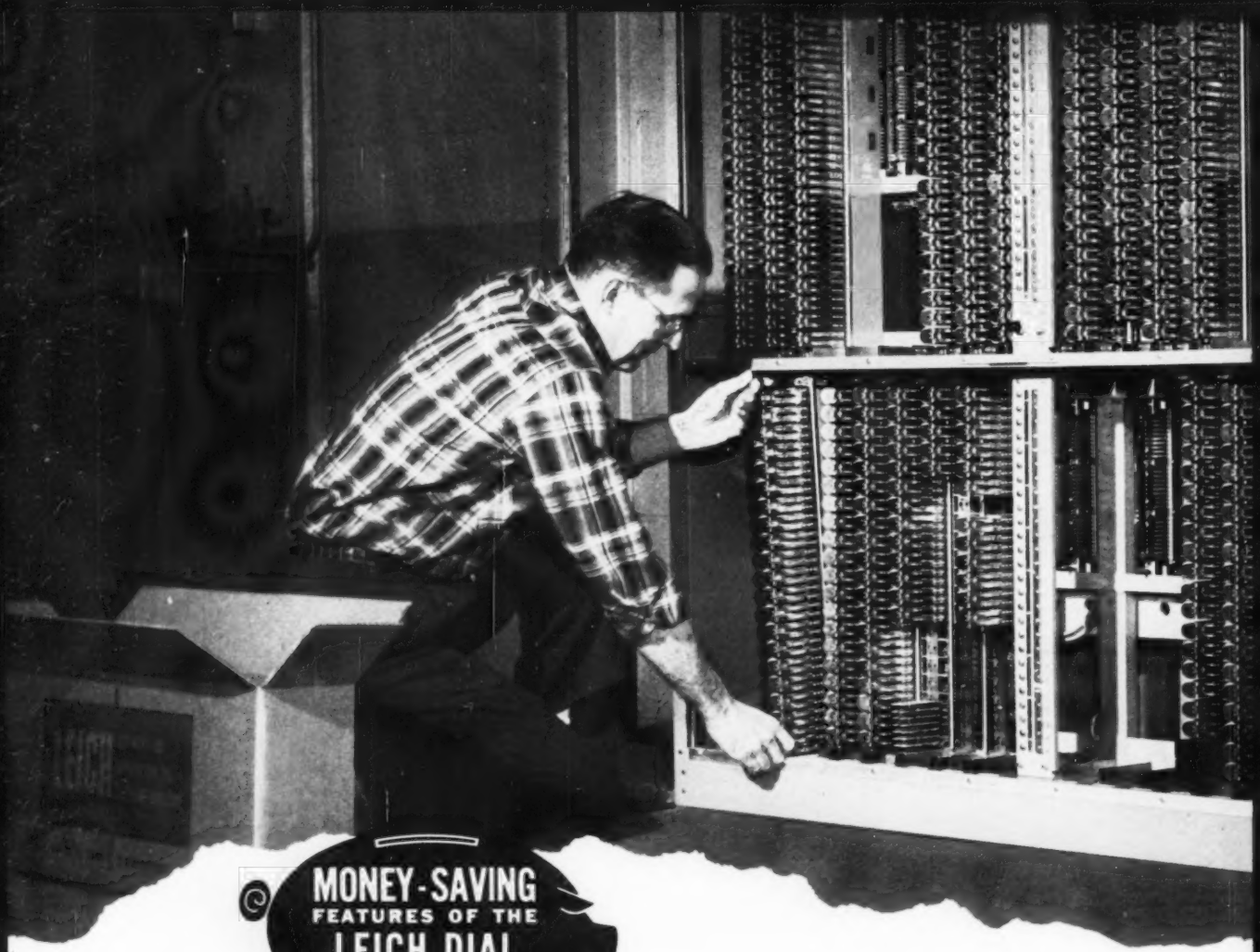

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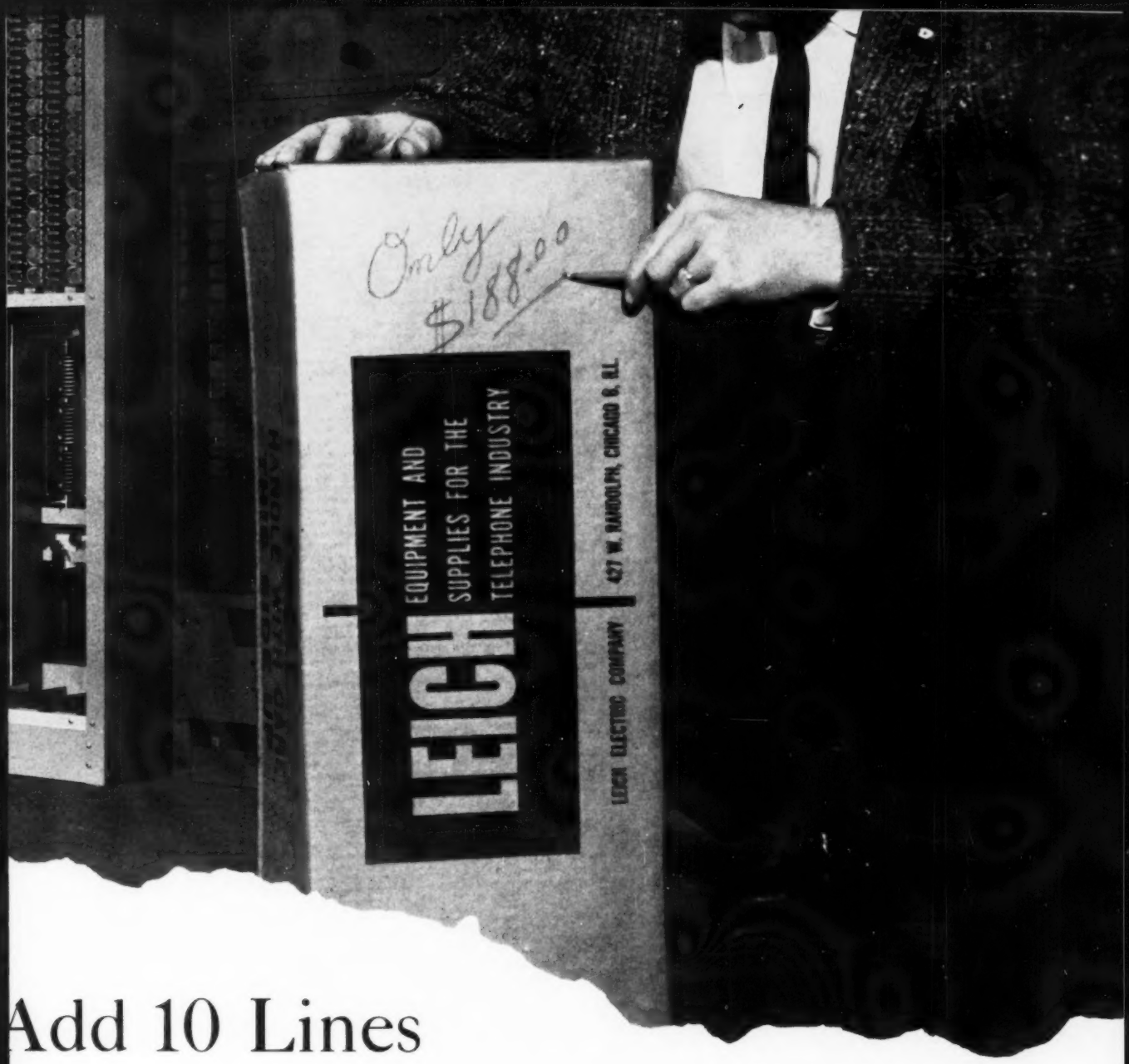

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IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR
AND EDITOR, PUBLIC UTILITIES FORTNIGHTLY

Ford opposed to putting FCC in a statutory strait jacket. Pressure building up against telephone excise taxes. FCC decision on private microwave applications expected soon. House committee begins hearings on Wage Hour Law.

THE LEAD-OFF man of a string of about 70 witnesses, slated to testify before the House Interstate Commerce Committee, was none other than the new chairman of the Federal Communications Commission, Frederick W. Ford. Ford, who had scarcely got his "chairman's chair" warmed on Mar. 16, was summoned by the chairman of the committee, Representative Harris (D., Ark.), to give the FCC's views on pending bills to reform FCC procedures and regulatory work in general.

This required something of a quick switch because, while the views of Ford's predecessor, former Chairman John C. Doerfer, had doubtless been prepared in anticipation of hearings before the House group, it was known that Doerfer's views did not always coincide with Ford's. Whatever the differences may have been between the two chairmen on such reform legislation (and we will probably never know), Ford was pretty forthright in rejecting the idea of putting the FCC in a statutory strait jacket.

First of all, Ford said that Congress has already given the FCC the authority it should have to regulate what the public can see or hear on television or radio. And he warned the committee (as had former Chairman Doerfer warned) against sweeping legislation to protect government regulatory agencies from improper influence.

On the touchy subject of regulating the ethics of the commission's personnel, Ford told the House committee that if Congress resorted to sweeping prohibition against "unusual hospitality," it might cause more confusion than benefit. Such a ban might be strained to the point of refusing to have anybody connected with radio, TV, or the telephone industries light a commissioner's cigarette. The new chairman did not think that he and his six fellow commissioners should have to draw themselves "almost into seclusion"—which might be indicated under an extreme interpretation of a pending bill governing agency ethics, sponsored by Chairman Harris.

Another member of the FCC, Robert T. Bartley, reminded congressmen that commissioners need "to get out and find what the public interests are." Two members of the committee, Rep. Peter F. Mack (D., Ill.) and Rep. William H. Avery (R., Kan.), were inclined to agree that it was "impossible" to write into law a practical code of ethics for regulatory commissioners. Mack thought ethics should be a matter of a commissioner's own conscience and good judgment.

Actually, the ban in the Harris Bill against "unusual hospitality," which drew most of the opposition from the FCC witnesses, was lifted out of a voluntary code-of-conduct draft drawn up some time ago by the Civil Aeronautics Board and the Interstate Commerce Commission. Somewhat along the same line is a voluntary code for the Securities and Exchange Commission forbidding its members to accept "unusual and lavish hospitality."

The FCC members and the committee also failed to come to any conclusion on Mar. 16 on how much "ex-parte" contact the commissioners should have with people who have business before the FCC. Ford said it was important to know when adjudication actually begins before his commission. The Administrative Procedures Act says a case starts with the filing of an application. Presumably the ban on ex-parte contact should start then and there. But the Communications Act says a case begins when the FCC sets a date for hearing on it.

Harris' committee will hear witnesses from all five regulatory agencies, plus witnesses for regulated industries, trade and bar associations, and law schools. Under study are two major bills (H. R. 4800 and H. R. 6774). The former bill would make it improper to attempt to influence an agency decision through pressure, capitalization, friendship, or business associations. This proposal was introduced by Harris and represents committee recommendations that have come out of previous hearings. The second bill (approved by the American Bar Association) would prohibit contacting agency officials about pending cases.

The Harris group hearings are sure to run for some weeks and will center around the question of just how much legislative protection against improper contacts can be made without strangling the flexibility of the regulatory agencies. In his opening remarks to the committee, Chairman Harris stated that his Sub-committee on Legislative Oversight had demonstrated the "inadequacy of existing safeguards of independence and integrity" of the regulatory agencies, and he indicated that Congress should give the regulatory

agencies better "guide lines" on how to keep free of influence peddling.

On behalf of the FCC, Chairman Ford endorsed a number of bills making minor technical changes. These included: S. 1735—to repeal the honorarium provision; H. R. 6127 and S. 1736—to eliminate the oaths or affirmation on certain forms; H. R. 6573 and S. 1738—to redefine duties of the review staff; S. 1965—to make uniform provisions of law with respect to terms of office of commissioners.

Meanwhile, the FCC, under Ford's new leadership, started cracking down on certain radio broadcasting practices which it considers in the category of "payola." It served notice that it would call on the carpet any radio and television stations engaged in such activities in the future. Chairman Ford said the FCC will now attempt to clarify the "payola" issue and exert its full regulatory authority under the Communications Act to prevent it.

The FCC announcement on Mar. 17 said that "many station licensees have failed to comply with the requirements" of a previous commission directive asking for full information from station licensees on this subject. The commission is now considering some cases "involving willfulness, misrepresentation, or serious neglect on the part of the licensee."

In its announcement, the FCC cited illustrations of certain practices (said to be widespread) which would get broadcasting stations in trouble with the commission if they are continued in the future. Among the practices condemned were: (1) acceptance of free phonograph records from phonograph record companies; (2) promotion of "record hops" by disc jockeys; (3) acceptance of transportation and accommodation by station employes; (4) so-called "sneaky commercials" or "plugola" where concealed advertisements or promotional material is slipped into the program without disclosure that it is paid publicity. In the future all stations will have to make "appropriate announcements" to inform listeners and viewers when promotions have been paid for on the air.

Satellite Communications

The Federal Space Agency said in Washington on Mar. 18 that one of the practical goals of its satellite program is to "provide world-wide television and telephone services." It also suggested that meteorological satellites may supply man with the information he needs to control the weather and alter climates. The National Aeronautics and Space Administration (NASA) raised these and other possibilities in its semi-annual report to Congress. The report covered the second six months of the new agency's existence.

In a letter to President Eisenhower, accompanying the report, Director T. Keith Glennan said the space program is now firmly based and "will continue to progress and gain momentum." NASA's primary long-range goal is manned flights of exploration to the moon and planets. Of more immediate practical promise are the weather, communications, and navigation satellites to be launched this year and next.

"As the program advances," the report said, "it is expected to improve weather forecasting, make navigation for air and sea travel more exact and timely, and provide world-wide television and telephone services. Eventually, perhaps, it may be possible to achieve some degree of weather modification and control." Another practical project calls for launching a 36-inch sphere with a flashing light into an orbit 1,000 miles high to serve as a "precise tool for mapping."

The agency also reported that in addition to developing ever more powerful booster rockets it is working on: (1) "A promising technique" by means of which a space craft would guide itself to a planet; (2) "astronomical satellites" which may learn whether nearby stars have planets, how stars are born, what causes the gigantic storms observed on the sun, and whether the universe is "growing old or standing still in time"; (3) electrical rocket engines which could be turned on in space to lift a communications satellite; (4) stop and restart engines and mid-course guidance systems to correct the trajectories of space craft embarked on long missions of 1,000 days or more to the planets and return.

Excise Tax Repeal Pressure

Bills continue to pour into the congressional hoppers for repealing the federal excise taxes on communication services. There were over 100 bills on Mar. 1, of which about 90 had been introduced during the first session of the 86th Congress. These bills are not all the same. Some would repeal federal excise taxes on telephones altogether. One, by Rep. Charles E. Goodell (R., N. Y.), would tie such repeal in with the transition of the taxing authority on monthly bills to states and local governments.

But the main thing to watch in this situation is how much effort is made to *extend* the present 10 per cent tax on local telephone service. Unless Congress acts on this, the tax goes off July 1, 1960. President Eisenhower, in his Budget Message earlier this year, said it was necessary to extend the tax because of Uncle Sam's tax revenue requirements if the budget is going to be balanced for the fiscal year 1961. We may be reasonably sure that an extension bill will be introduced on behalf of the administration, postponing the present termination date. But just how much steam will develop behind it is something else again.

Meanwhile out in the states there is some smoldering sentiment for the substitution of a state tax for the federal tax in this area. New York's Governor Rockefeller still stands by his proposal that New York take over the tax in order to use the proceeds for local school districts.

But Governor Rockefeller's own senate majority leader in the New York legislature — Senator Walter J. Mahoney (R., Buffalo)—talks more about the need for Congress to let the federal tax expire than he does about the state picking it up for school aid or any other reason.

On Mar. 5, Mahoney made public some replies received from 12 U. S. Senators and 62 Representatives to a questionnaire sent out by a nation-wide legislative organization. Of the 74 federal legislators, 26 "offered outright support to the campaign against federal re-enactment of the tax"; 19 "indicated they were favorable or sympathetic"; 28 "responded with friendly acknowledgement but did not commit themselves," and one "said he favored re-imposition of the tax."

Mahoney observed that there was "no partisan pattern apparent in the reaction." He added:

"I am convinced more than ever that Congress will agree with the appeals from the state, as expressed in the resolution of the Executive Committee of the National Conference of State Legislative Leaders against re-imposition of the 'emergency' telephone tax. The letters received in only five days are highly encouraging.

"This is particularly evident in the reaction of Senators and Representatives from states in which the telephone tax issue has not become involved in the local political situation. When the question is viewed on its merits, without political bias, reduction of the general federal tax burden on the nation's taxpayers becomes the primary consideration."

The Tax Foundation, Inc. of New York City recently reported that nearly 60 per cent—or 371 million dollars—of the 650 million dollars collected by the federal government in fiscal 1958 as excise taxes on long distance telephone, telegraph, cable, radio, leased-wire, wire and equipment and local telephone use came from the levy on local telephone taxes.

(Continued on page 54)

The Potential Market for

Telephone Answering Devices in the Service Industries

By ALEXANDER I. WARRINGTON*

THIS IS the fourth installment of Mr. Warrington's article presenting statistics on the so-called service industries, by regions and states, which constitute a big potential market for telephone answering devices. These statistics given in this series should be of value to market analysts in telephone companies and those in charge of marketing telephone services.

The third installment was published in the Mar. 19 issue, in which market data were presented for REGION III. East North Central—Ohio, Indiana, Illinois, Michigan and Wisconsin.

The second installment, covering REGION II. Middle Atlantic—New York, New Jersey and Pennsylvania, was published in the Mar. 12 issue.

The first installment appeared in the Mar. 5 issue, covering REGION I. New England—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

REGION IV. West North Central — Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska and Kansas.

(See "Impact of Telephone Communication on the Economies of the Various Geographic Regions of the U. S."—TELEPHONY, Aug. 8, 1959.)

Minnesota

Total service units of 62,400 were made up of 36,000 without payrolls and

TABLE 1

Total Number of Service Units, West North Central Region, 1960

Geographic Region and State	Total Number of Service Units			Percentage Distribution
	Without Payrolls	With Payrolls	Total	
West North Central	173,200	132,000	305,200	100.0
Minnesota	36,000	26,400	62,400	20.4
Iowa	33,200	22,800	56,000	18.3
Missouri	48,000	39,200	87,200	28.5
North Dakota	6,400	4,800	11,200	3.6
South Dakota	7,200	6,000	13,200	4.3
Nebraska	18,000	12,800	30,800	10.0
Kansas	24,400	20,000	44,400	14.9

This is the most basic table of the entire series. It is based upon the "1954 U. S. Census of Selected Service Industries," which was adjusted for 1960.

"Service units without payrolls" (first column) are, for the most part, individuals who operate some kind of service establishment as a regular business and without paid help.

"With payrolls" signifies service units that maintain paid employes.

26,400 with payrolls. This state accounted for 20.4 per cent of all service units in the region.

The two metropolitan areas shown in *Table 2* accounted for 44.8 per cent of the state's total service units.

The potentials for telephone answering instruments are as follows: Primary market, 32,000; secondary market, 6,300; tertiary market, 7,400. The total of 45,700 represents 3.7 per cent of total telephones.

Iowa

Total service units of 56,000 account for 18.3 per cent of the region's total. The state had 33,200 service units without payrolls and 22,800 with payrolls.

The six metropolitan areas, shown in

TABLE 2

Total Number of Service Units, West North Central Metropolitan Areas, 1960

State and Metropolitan Area	Total Number of Service Units			Per cent of State Total
	Without Payrolls	With Payrolls	Total	
Minnesota	36,000	26,400	62,400	100.0
Minneapolis-St. Paul	12,000	10,800	22,800	36.5
Duluth-Superior	2,800	2,400	5,200	8.3
Iowa	33,200	22,800	56,000	100.0
Des Moines	3,200	2,800	6,000	10.7
Davenport-Moline	2,400	2,400	4,800	8.5
Sioux City	1,200	1,200	2,400	4.2
Cedar Rapids	800	1,200	2,000	3.5
Waterloo	1,200	800	2,000	3.5
Dubuque	400	800	1,200	2.1
Missouri	48,000	39,200	87,200	100.0
St. Louis	20,000	17,600	37,600	43.1
Kansas City	10,400	10,000	20,400	23.3
Springfield	1,600	1,200	2,800	3.2
St. Joseph	800	1,200	2,000	2.2
South Dakota	7,200	6,000	13,200	100.0
Sioux Falls	800	800	1,600	12.1
Nebraska	18,000	12,800	30,800	100.0
Omaha	4,400	4,000	8,400	27.2
Lincoln	1,600	1,200	2,800	9.0
Kansas	24,400	20,000	44,400	100.0
Wichita	2,800	3,600	6,400	14.4
Topeka	1,200	1,200	2,400	5.4

Information is of the same type as in *Table 1*, except data are for metropolitan areas.

TABLE 3

The Market Potential for Answering Instruments, for the West North Central Region, by Degree of Intensity, 1960

Geographic Region IV and State	Number of Service Units			Total Number of Service Units
	Primary Market	Secondary Market	Tertiary Market	
West North Central	173,200	39,500	92,500	305,200
Minnesota	36,000	7,900	18,500	62,400
Iowa	33,200	6,800	16,000	56,000
Missouri	48,000	11,800	27,400	87,200
North Dakota	6,400	1,400	3,400	11,200
South Dakota	7,200	1,800	4,200	13,200
Nebraska	18,000	3,800	9,000	30,800
Kansas	24,400	6,000	14,000	44,400

The *primary* market is the market which will require the least effort and the units shown therein are close to the total of the number of answering devices needed. The need is urgent because the operator or the service unit has no tangible human assistance.

The *secondary* market represents service establishments that have one and only one paid assistant. This is also a rich potential market for telephone answering devices. Approximately 80 per cent of service units with one paid employe need answering instruments.

The tertiary market represents the balance of service units and has a potentiality for telephone answering devices of from 30 to 50 per cent of the units shown.

Table 2, are served by 32.5 per cent of all the service units in the state.

The potentials for answering instruments are as follows: Primary market, 30,000; secondary market, 5,500; tertiary market, 6,400. The total of 41,900 represents 4.9 per cent of total telephones.

Missouri

There were 48,000 service units without payrolls, and 39,200 with payrolls, a total of 87,200, or 28.5 per cent of the total of the region.

Four metropolitan areas shown in *Table 2* accounted for 71.8 per cent of all the service units in the state.

(Continued on page 57)

TABLE 4

The Market Potential for Answering Devices, for the West North Central Metropolitan Areas, 1960

State and Metropolitan Area	Number of Service Units			Total Number of Service Units
	Primary Market	Secondary Market	Tertiary Market	
Minnesota	36,000	7,900	18,500	62,400
Minneapolis-St. Paul	12,000	3,200	7,600	22,800
Duluth-Superior	2,800	700	1,700	5,200
Iowa	33,200	6,800	16,000	56,000
Des Moines	3,200	800	2,000	6,000
Davenport-Moline	2,400	700	1,700	4,800
Sioux City	1,200	400	800	2,400
Cedar Rapids	800	400	800	2,000
Waterloo	1,200	200	600	2,000
Dubuque	400	200	600	1,200
Missouri	48,000	11,800	27,400	87,200
St. Louis	20,000	5,300	12,300	37,600
Kansas City	10,400	3,000	7,000	20,400
Springfield	1,600	400	800	2,800
St. Joseph	800	400	800	2,000
South Dakota	7,200	1,800	4,200	13,200
Sioux Falls	800	200	600	1,600
Nebraska	18,000	3,800	9,000	30,800
Omaha	4,400	1,200	2,800	8,400
Lincoln	1,600	400	800	2,800
Kansas	24,400	6,000	14,000	44,400
Wichita	2,800	1,100	2,500	6,400
Topeka	1,200	400	800	2,400

This table is identical with *Table 3*, except it is for metropolitan areas.

TABLE 5

Percentage of Total Telephones Absorbed by Service Units, in the Primary, Secondary, Tertiary Markets for Answering Devices

Geographic Region IV. and State	Total Number of Telephones	Percentage of total telephones absorbed by service units			Total Number of Telephones
		Primary Market	Secondary Market	Tertiary Market	
West North Central	5,445,400	3.1	0.7	1.6	100
Minnesota	1,215,900	2.9	0.6	1.5	100
Iowa	1,025,700	3.2	0.6	1.5	100
Missouri	1,534,500	3.1	0.7	1.7	100
North Dakota	166,700	3.8	0.8	1.7	100
South Dakota	194,900	3.6	0.9	2.1	100
Nebraska	513,800	3.5	0.7	1.7	100
Kansas	793,900	3.0	0.7	1.7	100

This table should be useful to market analysts in making more detailed analyses and also in adjusting *Tables 1* through *4* annually. The adjustment of *Tables 1* through *4* can be made by using total telephones as a base. With the elasticity that is provided by *Table 5*, *Tables 1* through *4* should prove of service for at least five years.

Independents' Part in

National Transmission Improvement

By CARL H. NELSON

ONE OF THE many things that makes this nation the greatest nation on earth today is the unique ability of common interest groups of people to work together for the benefit of all. Such a group is the United States Independent Telephone Association, which represents the 3,700-odd Independent telephone companies in the United States. One of the current activities of the Independent Association, through the Sub-Committee on Transmission and Protection of the USITA's Engineering Committee, is to acquaint Independent companies with present transmission requirements for nationwide toll dialing.

The communication industry has made tremendous advances in the art of transmitting the human voice from one telephone instrument to another regardless of the distances between them and doing it with speed, reliability and quality. Work is being accomplished through the implementation of Direct Distance Dialing (DDD), or "nationwide dialing." This plan employs a relatively new term, "Via Net Loss" (VNL), which is making possible faster, more reliable and higher quality long distance service that results in greater customer use. In fact, hardly anyone is any farther from a member of his family or a business associate than a telephone whose transmission is uniform in volume and free of the disturbing effects of noise, crosstalk, echo and singing.

VNL, briefly defined, is the maximum loss measured in decibels at which a circuit can be operated without objectionable noise, crosstalk, singing or echo when switched at both ends to other toll circuits.

VNL "factors" have been developed, expressed in db per mile, which when multiplied by the length of a circuit give the loss at which the circuit can be operated and switched in the nationwide dialing plan. "VNL Factors" for three types of facilities are as follows:

	db per mile
Open wire carrier (four-wire)	.0017
Open wire at voice frequency (two-wire)	.01
H-88 loaded exchange cable	.4

In order to meet the standards of this plan in our own areas, we are concerned with transmission on facilities that can be divided into four categories that will be discussed separately (See *Fig. 1*). The categories are as follows:

Intertoll trunks.
Toll connecting trunks (end links).
Local loops.
Interoffice and extended area trunks.

"Intertoll Trunks" is that portion of the toll plant which connects toll switching offices with other toll switching offices and are maintained at VNL of .5 to 2.5 db designed to be free of noise, crosstalk and singing. This "Quality Control" is made easier by use of all types of open wire carrier, a four-wire facility with built in regulation control, making transmission levels more easily obtained and maintained than is possible on two wire circuits. Practically all Intertoll Trunks are now on four-wire operation and use carrier.

The "Toll Connecting Trunk" connects the "End Office" to the Intertoll Network. Care is taken to avoid echo producing irregularities at toll switching offices employing switched VNL trunks. This is not possible at "End Offices" because the toll connecting trunk is connected to Local Loops of many different circuit characteristics.

Since all toll connections involve two Toll Connecting Trunks, each Toll Connecting Trunk must be operated at a minimum of 2.0 db to avoid connections which will produce objectionable echo. The design of Toll Connecting Trunk plant becomes a two-fold problem:

(1) Short trunks with losses of less than 2 db must be padded out to VNL + 2 db (this includes intra-office trunking between intertoll and local selectors when in the same building).

(2) Reducing to 2 db the loss of longer Toll Connecting Trunks. In many cases, it is doubtful that this low loss can be justified economically, however, with the application of trunk loading, negative impedance repeaters or short-haul trunk carrier, a VNL + 2 db standard for Toll Connecting Trunks is an objective easily obtained.

The "Local Loop" is just as important as the Toll Connecting Trunk and Intertoll Trunk in furnishing good nationwide long distance service, but has not received as much attention. A few Independent companies are concerned with Intertoll Trunks and many are concerned with Toll Connecting

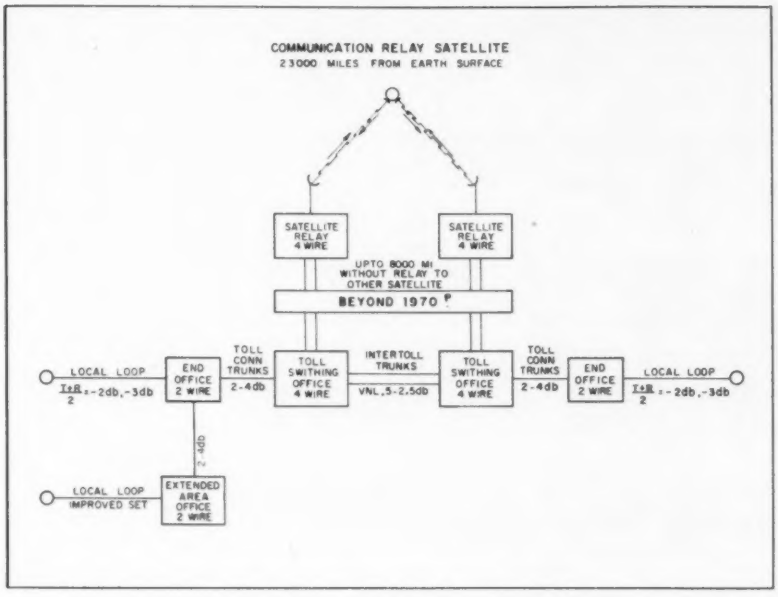


Fig. 1

Trunks, but all Independent companies are concerned with Local Loops.

The question that now presents itself is "How can we determine what is proper transmission for a Local Loop?" It is easy to measure line losses over fixed facilities such as Intertoll and Toll Connecting trunks. Because of the varying efficiency of telephone sets operating over different circuit characteristics, we, at this time, cannot combine this Local Loop with the fixed facilities to determine the over-all transmission of the circuit. At this time we can only determine the effective transmission of a Local Loop with a particular instrument and an average transmitter and receiver gain, expressed as $\frac{T+R}{2}$. The objective of $\frac{T+R}{2}$ for Local Loops is −2 to −3 db.

There is under development, a test set which will actually measure the true gain or loss of Local Loops, including the telephone instrument. When available, we can add these measurements directly to trunk losses to determine the over-all transmission rating. Until such a tool is developed, we will continue to use the tools we have.

Before the high efficiency subsets were made available for general use, the exchange loop design was limited to transmission. Supervision and signaling imposed restrictions on design in some cases, but transmission limits were reached long before the resistance limits. Today, we have the 48-volt battery dial office, plus exchange cable loading over 18,000 feet and the new high efficiency subsets in common use. The reverse design considerations have become paramount. Supervision and signaling resistance limits have become the prime consideration in subscriber loop design.

One of the modern tools in common use is called "Resistance Design," which makes use of a chart that indicates various cable gauges and plotted loop resistance against loop length in feet. (See *Fig. 2*). Application of this Resistance Design Chart is accomplished by use of the following guide lines:

(1) Select the most economical gauge or combination of gauges to stay within the loop resistance range of the central office equipment.

(2) Use the new type high gain telephone instrument only where needed, such as on 26-gauge cable loops over 10,000 feet.

(3) Apply H-88 loading to cable and "B" wire which extend beyond a selected distance, usually about 18,000 feet.

(4) Limit the length of bridged cable to about 6,000 feet.

Explanation of Chart

The "change set" line indicates the distance from the central office in feet that the FIA telephone instruments will produce the objective $\frac{T+R}{2} = -2$ db.

The gain derived from loading cables is as follows:

22 and 24 gauge (1.5N - 1.5) db
19 gauge (1.1N - 1.5) db
When N = Number of load points.
Resistance of loading coils is 9 ohms per load point.

The Problem: Design a feeder cable 24,000 feet in length that will meet the resistance limits of the central office and provide quality transmission, using the material on hand. Cable inventory shows 14,500 feet of 24-gauge and 11,000 feet of 22-gauge cable on hand. Four loading coils will be required because the length is 6,000 feet beyond the 18,000 foot limit for non-loaded cables.

Solution: Supervisory and signal limit for the equipment is 12,000 ohms. Allow 150 ohms for the subset and 36 ohms for the load coils, the line loop resistance will be corrected to 1,014 ohms (1200-186). Establish Point A at 24,000 feet and 1,014 ohms. From Point A, draw a line parallel to the 22-gauge

(Continued on page 56)

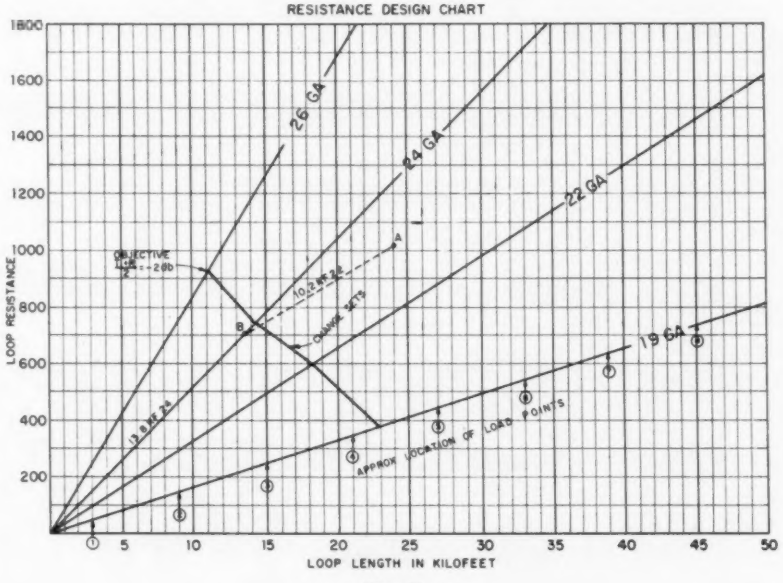
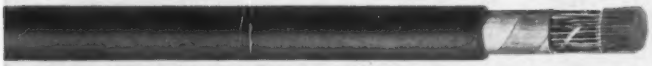


Fig. 2



Paper Insulated Lead Sheathed Telephone Cable

Paper Insulated Lead Sheathed Telephone Cable—Armored

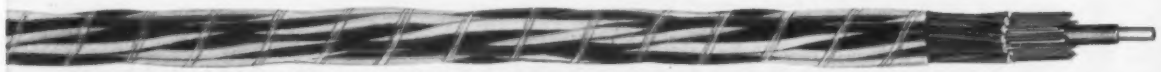
Paper Insulated Lead Sheathed Telephone Cable—Jacketed

Rubber Insulated Lead Sheathed Telephone Cable

Exchange Area Telephone Cable—Aerial & Duct Type

Exchange Area Telephone Cable—Direct Burial Type

Rural Distribution Telephone Wire—.109 Inch Steel Support Wire



Rural Distribution Telephone Wire—.134 Inch Steel Support Wire for long span installations

Urban Distribution Telephone Wire—.109 Inch Steel Support Wire

Interior Telephone Cable

Drop Wire—Paralleled Figure 8

Drop Wire—Paralleled Reinforced

One-Pair Aerial Distribution Wire

Thermoplastic Station Wire

Polyethylene Insulated Bridle Wire

Buried Distribution Wire

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THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

THE STATE OF California has launched a program aimed at detecting the bad driver before he can cause a serious accident. Two penalty points are assessed against the driver's record for driving while his license is suspended or revoked; for drunken driving, or for any reckless or hit-and-run driving.

For other traffic violations such as following too close, running a stop sign, or changing lanes illegally, he is fined one point.

Then, if the driver chalks up four points in a year, six in two years, or 8 points in three years, the state presumes that he is a "negligent operator" and puts him under investigation to determine whether his driver's license should be suspended or revoked.

This investigation consists of a careful appraisal of a person's physical ability to drive, his knowledge of motor vehicle laws, and his attitude toward these laws. This program is getting good results. Not only is it taking bad drivers off the road, it's also reforming the habits of thousands of drivers.

•

The writer, along with a number of cable manufacturers, recently attended a program committee meeting in New York City to assist with plans for the Ninth Annual Symposium in the field of communication wires and cables to be held on Nov. 30, Dec. 1 and 2, 1960 at the Berkeley-Carteret Hotel, Asbury Park, N. J.

This meeting is sponsored jointly by the U. S. Army Signal Research & Development Laboratory at Fort Monmouth, N. J., and industry. Technical papers containing new information of interest to the communications industry will be presented.

The first symposium was held in 1951, with a registration of only 433. In 1959, the registration had increased to 1,050, with a total of 191 companies sponsoring the meeting. The steady growth shown each year indicates that this particular meeting fulfills an important need of the industry.

•

Dr. Vern O. Knudsen, physicist and acoustic expert of the University of California, claims that a noise level of 160 decibels may kill animals, such as rats and mice, whose body temperatures rise when exposed to such intense sound.

Further, during the past 30 years, the noise level to which humans have been exposed has been increased from 120 to 150 decibels. In Dr. Knudsen's opinion, this noise level has contributed to impairment of our hearing and the functioning of our nervous system.

•

The Southwestern Bell Telephone Co. has microfilmed 150,000 engineering drawings. These drawings formerly occupied a large room in Dallas and now they require only a few feet of storage space. Instead of occupying rows of library-type "stacks," the large sheets are now filmed, inserted in special IBM cards, and sorted according to type of drawings, contractor, etc. They are then conveniently filed in a few drawers.

In addition to the space saved, the new microfilming plan also saves time. When an engineer has a need for a particular drawing, he merely calls the Bell Engineering Library. The card is pulled, a print is made and delivered, all in a matter of minutes. Return of the drawing is unnecessary as the original film is always on file.

•

It is reported that a defense alarm system will be placed in service in the near future which will give an instant warning if key military bases are destroyed by a surprise attack. This bomb alarm system could carry word of nuclear explosions in more than 100 locations to top military officials and the White House. The system could also enable Civil Defense officials to direct help quickly to disaster areas.

The warning equipment will be mounted on at least three wooden poles located several miles from each key target. Its function is to receive from the heat flash of a bomb a light signal that will trigger a special sensing mechanism.

This signal would be carried over teletypewriter circuits to top government officials, giving immediate indication of which areas are hit. This would all take place before the alarm units are knocked apart by a nuclear shock wave. Only a thermo-nuclear explosion can trigger the device.

•

A soft-cover book of 128 pages, titled: "How to Troubleshoot TV Sync Circuits" can now be purchased from TELEPHONY for $2.90. This book should prove especially interesting to telephone men who enjoy dabbling in TV maintenance.

The book discusses one of the most important functions of the television receiver—triggering of the vertical and horizontal sync signals. Troubles within the sync system of a television receiver are a frequent cause of poor reproduction of the received signal; precise accuracy is required in repairing and adjusting sync circuits.

This book will prove helpful to both the experienced technician and the beginner, assisting each to readily recognize and locate troubles in these important circuits.

•

Crosstalk: It is said that he is indeed a gentleman who is polite to a telephone solicitor calling in the midst of a favorite TV program.

•

Business is likened to a bicycle—when it isn't moving forward at a good speed, it wobbles.

THE SPACE AGE

MAN'S ATTEMPT to conquer space, for one reason or another, dates back many, many centuries, and each of his efforts has given him added knowledge, and has taken him a little bit further beyond the known. Where does he draw the line? When and where does he become contented that he has reached his ultimate objective, or does he?

From each of these space experiments, come many new theories and many new practical approaches, many of which are of specific interest to telephone people.

"Moon-talk" and "global communications," via man-made "moons" and "artificial ionospheres," have been discussed in previous editions of this column and further light has been shed on the subject by Dr. Leonard S. Sheingold, director of Applied Research Laboratory of Sylvania Electric Products, Inc., in an address before the Armed Forces Communications & Electronics Association.

Dr. Sheingold stated that a globe-circling satellite network, 2,000 miles in space, together with "artificial moons," 22,000 miles in space, would serve as space communication and space switching stations, and would make possible reliable world-wide telephone communications and television programs, as well as contact with space ships.

"Creation, first, of an artificial ionosphere and then of an interim satellite system may be the initial steps toward the futuristic satellite switching station network," Dr. Sheingold stated.

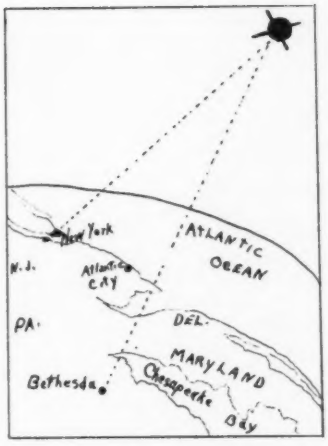
Dr. Sheingold pointed out that the need of such a communications network is well recognized, since "present transoceanic communications are limited to very long wave-lengths and short-wave radio and submarine cable with telephone bandwidths."

In describing some of the practical problems facing such a communications facility, Dr. Sheingold stated that in addition to the useful satellites in orbit, there is also much space debris, such as the recently discovered mysterious satellites now in orbit. He went on:

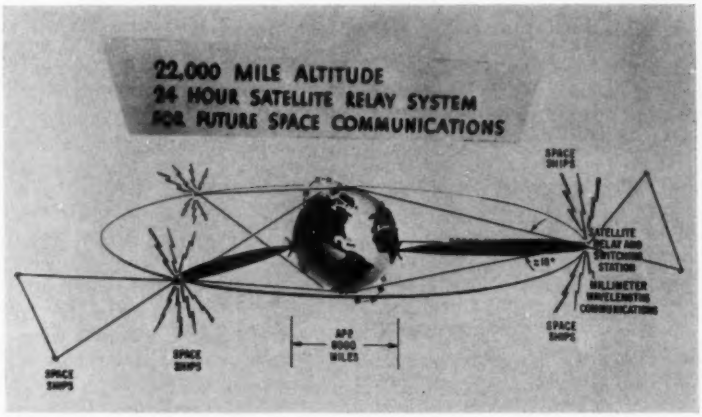
"There appears a real market for a space 'vacuum cleaner' to remove all the unwanted debris.

"The extraneous orbiting material would obviously provide considerable interference for the many types of communications, and would prevent accurate tracking of passive satellites."

Radio contact, believed to have been the first two-way communication via man-made artificial satellites, was established by two teen-age ham radio operators, using presently orbiting satellites.



The radio-contact was made between New York City and Bethesda,



A globe-circling satellite network, together with "artificial moons" to serve as space communications and space switching stations, will make possible continuous world-wide communications.

Md., 200 miles away, on Feb. 6, and came at a time when the United States' Explorer VII satellite and Russia's Sputnik were passing in low orbit, approximately 150 miles east of Atlantic City, N. J.

The two youths had obtained from the Smithsonian Institute, necessary satellite prediction charts, and from these charts they had calculated the time at which the two satellites would be passing near enough to provide the conditions for communications.

Contact was established while operating on a frequency of 21.011 megacycles, at approximately 300 watts, and utilizing a previously determined code.

Reports indicate that at one time during transmission the Explorer VII was nearly 1,500 miles away.

DATA TRANSMISSION

OVER THE past few years many industrial and business organizations have decentralized their operations and are establishing plants and offices in remote areas of the country. With an increased trend toward decentralization, will come a greater need for faster and more accurate communication of records and data between branches and headquarters —a need that can only be provided for by data transmission equipment.

Many organizations have already installed, or are considering installation, of data transmission systems.

Chrysler Corp. has undertaken a program to establish data communications between their various offices and plants. At present, they are evaluating a system and, in a nine-day demonstration, information from more than 500,000 punched cards, at the rate of 100 per minute, was transmitted over a telephone line. Binary-punched computer program cards, as well as payroll accounting and parts inventory cards, were transmitted. The demonstration was performed on a circuit which linked the company's general offices in Highland Park, Mich., with the Dodge main plant in Hamtramck, Mich.

In operation, the system reads the cards, converts the punched information to audio signals and transmits them over telephone or radio circuits. At the distant terminal, the receiving equipment converts the audio signals back to punch card form. The system is designed to operate full-duplex, with cards being transmitted and received in both directions, simultaneously.

RADIO NOISE AFFECTED

IN A technical report of the National Bureau of Standards, significant changes in recorded radio noise were observed at its station at Kekaha, Hawaii, before and after two high-altitude atomic explosions were set off over Johnston Island in the Pacific Ocean in August, 1958.

The two bomb blasts occurred shortly after midnight on Aug. 1 and Aug. 12, at altitudes estimated to be between 25 and 100 miles. In the first hour following the blast, noise decreased as much as 32 db (at some frequencies), at a time of day when it would normally be rising or holding steady. Recovery apparently occurred in a matter of hours at frequencies of 13 kilocycles and 5 megacycles, but from 51 kilocycles through 2.5 megacycles, a changed pattern was evident for several days.

Such an analysis would seem to indicate that the bomb explosions caused increased absorption at certain frequencies, while at other frequencies little effect was observed.

ELECTRONIC EXCHANGE

A MAJOR advance in telephone switching technique was introduced in Paris, last month, with the installation of a 240-line electronic private telephone exchange. The exchange, which does not contain a single moving part, incorporates a control circuit that is said to function 10,000 times faster than the electromechanical exchanges now used throughout the world.

The telephone exchange was placed into operation and demonstrated by the Laboratoire Central de Telecommunications, a French associate of International Telephone & Telegraph Corp.

Professor Goudet, general manager of LCT, in an address before the American Institute of Electrical Engineers, compared the operation of the control circuit of the new exchange with that of the electromechanical exchange.

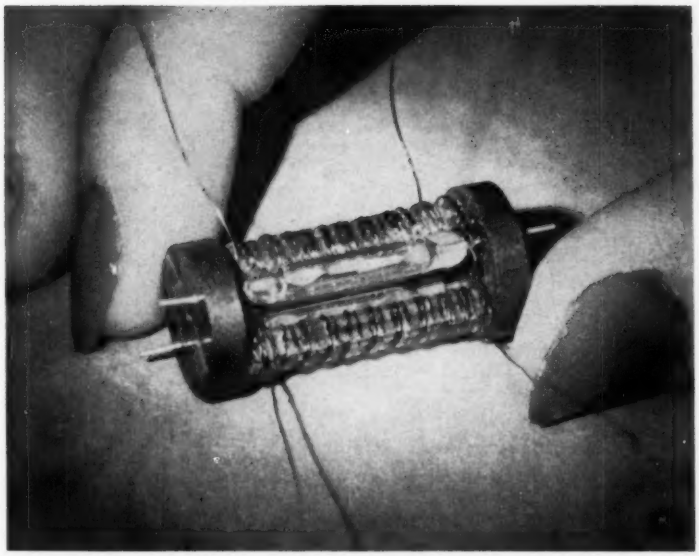
"In most up-to-date systems, when a subscriber lifts his receiver, Professor Goudet said, "a very complex

control device, the so-called register, is assigned to him. For example, in a 10,000-line exchange, 100 registers are provided. This device comprises a very large number of electromagnetic relays which operate in precise order to store the called number. The register then automatically carries out the logical operations necessary for controlling the establishment of the communications wanted. This is done by closing a certain number of contacts selectively chosen."

In describing the newly developed control circuit, he said: "The registering itself is effected by magnetic memories made of ferrite cores. The logic operation, started by the storing of the called number, is devoted to a single 'logic' circuit which replaces the registers. The circuit is fundamentally of diodes and transistors, and its activity is shared by the 240 subscribers' lines.

"Following the decisions of the logic circuit, communications are established through electronic contacts made of cold-cathode gas tubes that are switched on or off in one thousandth of a second.

"After all information is inserted in the exchange, the speed of operation is equivalent to connecting 60 calls per second."



The Ferreed, a development by Bell Laboratories, is a fast electromechanical switch with metallic contacts. Control pulses of 5-microsecond duration, will switch the magnetic material. Shown above is a two-branch Ferreed.

FAST SWITCH

IN CONVENTIONAL relays, continuous electrical currents can be utilized to hold open or closed a set of metallic contacts; however, the operation of conventional electromagnetic relays has certain limitations, in that the speed of energizing and de-energizing the device is limited by the mechanical motion of the moving parts.

On the other hand, with magnetic materials, which are being used in memory storage devices for indication of one of two states, the readout is fast, but the output from these devices is transient in nature.

A team of engineers from Bell Labs has recently developed a device which combines the rapid switching of the bi-stable magnetic material with the functions of continuous operation of conventional relays. The device called the "Ferreed," utilizes a technique for actuation compatible in speed with electronic switching. In several prototypes, a cobalt ferrite has been used as the magnetic material and a glass-sealed magnetic reed switch for the output contacts—thus the coined word "Ferreed."

In the sequence of operation, a voltage is applied to the winding to produce a 5-ampere pulse in a 30-turn winding, and the created magnetic field causes the contacts to close. The contacts will remain in

this state until release is brought about by cancellation of the field by another pulse of current.

Control pulses, as short as 5 microseconds, will activate the magnetic material, although closing of the contacts is delayed for several hundred microseconds, due to inertia of the reeds. Opening of the contacts requires less time than closing. Other ferrites may be used as the magnetic material to create characteristics midway between permanent magnets and computer memory materials.

It is expected that the device may find usage as an interconnecting control element in telephone switching, where control would be accomplished many times more rapidly than by existing switching apparatus.

MICROWAVE TRANSISTOR

BELL Telephone Laboratories has announced the development of a new germanium mesa transistor, which is capable of operating in the low microwave frequency range, and a design of a very wide band amplifier employing this transistor. Employing transmission line construction, the physical parameters of the newly developed transistor, have been reduced so that the active region is less than the cross-section of a human hair.

Constructed as a diffused-base, allowed-emitter, p-n-p mesa transistor, it is designed for application as an oscillator at 3,000 megacycles and as an amplifier at 1,000 megacycles and below.

In order to reduce the amount of parasitic capacitance and inductance to allow for the realization of the full capabilities of the new device, it is mounted in a coaxial shell which electrically matches a 50-ohm coaxial transmission line.

Functioning as an amplifier, the new device has a gain of 18 db, flat within 1 db over the frequency band, from below 1 megacycle to over 750 megacycles.

SAGE COMMUNICATIONS

SAGE (Semi-Automatic Ground Environment) is a vast air warning system now being implemented throughout the United States and Canada. It is to supplement and compliment other warning systems such as White Alice, the Dew Line, and off-shore Texas Tower installations. It is part of an "umbrella" air defense.

Many existing components of SAGE have been modified and many new components are added as new techniques are developed. A recent augmentation to SAGE has been a special high-power radio transmitter, designed by International Telephone & Telegraph Corp., whose specific function is to transmit information for guidance of missiles, rockets, and aircraft that would be sent aloft to destroy enemy missiles.

Designed for reliability under adverse temperatures ranging from 20 degrees to 120 degrees Fahrenheit, representative of temperature extremities of SAGE system site locations, the power output of the transmitter is rated at 20,000 watts. The workhorse of the system is a 5-foot klystron amplifier tube which boosts the power input of five watts to the output power of 20,000 watts.

While, in its present stage, the transmitter is limited to use by the military, ITT engineers report that the techniques involved are applicable to over-the-horizon communication systems and to space communications.

DIAMOND TRANSISTORS

DIAMONDS, known to be nature's hardest substance and a girl's best friend, may also prove invaluable in transistor design.

H. F. Oppenheimer, chairman of De Beers Consolidated Mines, Ltd., and Industrial Distributors, Ltd., which sponsors the Diamond Research Laboratory in Johannesburg (the only laboratory of its kind in the world devoted exclusively to study of the diamond) announced the installation of a new high voltage electron accelerator for use in the production and study of new effects in diamonds. Through its use, the hardness, electrical conductivity, and surface structure, as well as other qualities of the diamond, may be altered by the extended electron velocity, which will propel electrons at velocities up to about 180,000 miles per second, nearly the speed of light.

Semi-conductive diamonds could serve efficiently as point-contact transistors, with the feature that diamond transistors can be subjected

to large fluctuations of temperature without damage or loss of efficiency.

POTENTIAL HAM?

ONE WAY to obtain an education in electronics and make contact with other people having the same interests, is to become a "ham" radio operator. An initial step in this direction is to obtain a "novice license."

A concise, compact pamphlet, "Short Course for the Novice License," has been issued by Electronic Instrument Co., Inc., 3300 Northern Blvd., Long Island City 1, N. Y. The short course is available upon request at no charge.

The four-page brochure lists the Morse Code and Popular Q Signals, states the common abbreviations in "ham" usage, and devotes an entire section to questions similar to those found on the required FCC examination.

PRINTED CIRCUITRY

A NEWLY developed surface-mounted panel meter, incorporating a printed circuit coil in conjunction with a thin ceramic ring magnet, a revolutionary approach in meter movement design, has been announced by Interlab, Inc.

The meter, requiring approximately 12.25 square inches of surface mounting space is available in several ranges, from 1 ma. to 1 amp., and from 10 volts to 500 volts.

The entire meter is contained in the scale housing and only the terminals, which also serve as the meter support, extend from the rear. Thus, the problem of drilling large holes through which the meter movement must extend is no longer encountered.

Other interesting features are:

(1) Self-Shielding. Provides protection from nearby magnetic influences, such as choke coils and transformers.

(2) Stability. Does not lose sufficient magnetism, with a consequent loss of accuracy, in a year or two, as do certain other meters.

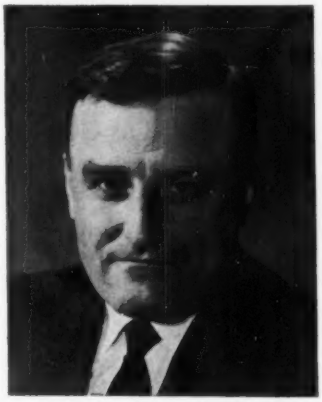
(3) Utilizes nylon pointers which are unaffected by overload shock-contact with the limit stops.

Advertisement

How To Get Your Money's Worth From Electronic Equipment!

THE TELEPHONE industry is rapidly taking advantage of new developments in electronics. This is only natural. Since the telephone first came into existence, telephone men have been quick to recognize the value of new developments.

Thus it is not surprising that the industry is using more and more electronic equipment. Mobile radio is used to connect telephones in cars, trucks and other vehicles. Microwave relay links are used in place of wire and cable in many places. Electronic carrier



Carl E. Smith, E. E., President Cleveland Institute of Electronics

circuits and repeaters result in better utilization of existing (and proposed) facilities.

All of these improvements are available today. Tomorrow will see even greater advances. The manufacturers of telephone equipment can be relied upon to give you the kind of equipment you need to fulfill your obligations to your subscribers.

However, you should keep in mind a fundamental principle of management . . . a chain is only as strong as its weakest link. Thus, no matter how big or small you may be, your equipment will not give maximum performance unless it is maintained by competent technicians.

Every company has a technical staff. It may consist of hundreds or perhaps thousands of men . . . or there may be only two or three. These men know and understand telephone technology as it used to be, but in all honesty, do they understand the fundamentals of electronic circuitry?

If they aren't on speaking terms with oscillators . . . rectifiers . . . amplifiers . . . transistors . . . etc., they are not going to be able to give you the technical support you need. A man may be able to wire a central office switchboard in the dark, but if he isn't skilled in the mental tools of electronics, your new equipment will not give you the service you paid for.

In all probability your present staff is very capable. You wouldn't have one which didn't give you the reliability you must have. Therefore they are the logical men to take on the maintenance of electronic equipment . . . as soon as they have received a sound foundation of electronic fundamentals.

This can be done economically and without the loss of valuable man hours by a non-resident training program. Several schools offer this service. They teach your men the fundamentals of electronic circuits. Then, with the ability to understand the principles of any electronic device, your company and the equipment manufacturer have only to conduct a brief orientation of the specialized equipment.

This plan has been used successfully by many companies. It has helped them . . . and it can help you. It will pay you to investigate and get the facts.

For full information on schools providing training in electronic theory and FCC license preparation, write to the National Home Study Council, 1420 New York Avenue, N. W., Washington 5, D. C.

If you would like the details on a "guaranteed" Employers Plan for training technical personnel, write to

THE REGISTRAR
CLEVELAND INSTITUTE OF ELECTRONICS
4900 EUCLID AVENUE, DESK TE-43
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THE Operator's Corner

By MAYME WORKMAN — TRAFFIC EDITOR

YOUNG PEOPLE are an asset in industry. The wheels of progress could not turn without them. This is particularly true in the telephone industry; especially so in the traffic department. Good eyesight, acute hearing, nimble fingers, and the ability to learn quickly, are the endowments of youth.

As in other industries, hundreds of new people are inducted in the telephone industry each year. Many of these youngsters of today will be the Pioneers of the industry in the future.

An interesting article on this topic appeared in a recent issue of Illinois *General News* . . . "So Goes the Tree."

It contained a fund of valuable information on the subject of inducting new people into the organization and it is recommended reading, especially for supervisory personnel. The article states:

"In business as well as in nature, the way a young employe is initially handled, means the difference between success and failure.

"One of the great assets of any business is its young people. Their sharp eyes, quick fingers, energy, and readiness to learn are priceless commodities. Yet young workers on unskilled entry jobs account for much of our turnover. If they leave before they can be moved on to more skilled jobs, it costs time, money, and wasted effort.

"Capitalizing on the assets, and reducing the problems in the employment of young workers, is a challenge to each of us, for the work habits and attitudes that young people learn in their early jobs may last a lifetime.

"Supervisors should be constructive counselors to youth, and their influence will go beyond the immediate job. Helping people find satisfaction in work has many rewards.

"Young people often want different things from a job than do older people. Human relationships are important to them. They usually want, most of all, to like the people they work with, and to be liked by them. They want the boss to like them, too.

"*Learn From Observing*—Young employes learn from observing their supervisors and their fellow workers as well as from what they are deliberately taught. The new worker has no shop know-how, and has never experienced the routine things we're likely to take for granted in a work situation.

"Every supervisor wants his workers to be cooperative, to be willing to pitch in when emergencies arise, to have pride in the organization and to feel they have a stake in it. He has a great opportunity to develop good attitudes in his young workers. They're impressionable, and after all, they chose to work in our organization.

"Stress the "we" and not the "I," and make them feel they belong. Learning about the company organization, the employe benefit program, and top management personnel and policies, will boost their morale. Young workers can be stimulated to take an interest in their job, by helping them see that their work is needed, and how it fits into the whole pattern of the organization.

"Initiative can be developed by encouraging them to join in figuring out ways of cutting out waste or of making their work easier or better.

"*Praise Them*—Praise them when their work merits it. It may be just the spur they need and will make them feel that their supervisor is a friend.

"It is a good idea to carry out a program of orientation for all new employes. Understand that they must have help in adjusting to their new jobs. But it takes more than time and attention to specific details to get young workers off to a good start.

"This is well worth doing, because they have many useful years ahead of them if they get started right. A friendly word can be a life-line. Once they have some confidence if they're familiar with their surroundings, know their fellow workers, and understand who's to give them orders—they'll be able to learn faster.

"Take time to show them where all of the facilities are—washrooms, lunchroom, drinking fountains—and what to do in case first aid is needed. Explain how, when, and where they'll be paid, why deductions are made, and why some pay is held back. Company rules should be explained to them before they inadvertently offend. Other workers can help by accepting the younger ones in their give and take on the job—not by bullying them or by playing practical jokes on them.

"*Explain Lingo* — Don't just tell young workers what to do—show them how to do it, step-by-step. Talk to them in words they'll understand. Special terms and lingo may be confusing to them until they are explained. Make it easy for them to ask questions.

"Most beginners worry more about speed than quality. They need to know what is considered of first importance —speed and quality. They may not realize that keeping a steady pace and doing the job right makes a difference to their fellow workers. Young people don't mind a supervisor being firm about things that matter, as long as he's fair and square.

"*Verify Age*—Employers are often penalized for employing minors in violation of state regulations. Some youths may misinform on their age, in order to get a job. The only way to be certain about the matter is to see that they obtain employment or age certificates, before hiring them.

"With a little effort on the part of each of us, young workers will get off to the right start in the business world. It's good business to see that ambitious young workers get a chance to use their highest capacities."

Traffic Questions

(1) Where should active toll tickets, on which subsequent attempts are to

(Continued on page 60)

When M STRANDS go up your costs come down

It's true economy to install guys and messengers made of Copperweld Type M Strand. There are no maintenance costs—no replacement costs. Because Type M Strand is non-rusting, you eliminate, once and for all, the problems and expense caused by the deterioration and failure of rust-weakened guys and messengers.

Type M Strand gives you the same long life and freedom from maintenance that has distinguished Copperweld Products for over 40 years. Each wire is permanently protected against corrosion by a heavy copper sheath inseparably molten-welded to an alloy steel core. And, because of the molten-weld, the copper will not crack, flake or peel. Easy to handle—easy to install—Type M Strand can be readily bent, served, moused or clamped.

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FOR GUYS AND MESSENGERS

PULSING PLUS

Part 2. Application of Quality Control Charts to pulsing and transmission deviations. Part 1 in Mar. 19 issue.

By D. G. PLASKETT*

THE PUBLIC expects quality telephone transmission. Surveys of customer's opinion and other investigations have revealed that the public expects that a telephone call, regardless of distance, should sound about the same as a conversation between two people in average quiet surroundings.

When you add this telephone transmission goal to the Direct Distance Dialing (DDD) plan, several factors become apparent. Since one or two poor links in a multi-link long distance call can spoil the entire connection, the industry has embarked on a program that features better quality circuits designed to operate at their highest non-singing Via Net Loss (VNL) levels. With customer dialing, no operator could check the quality of a circuit before using it, therefore a more efficient effort than ever is necessary to control the spread of net loss deviations per link so that their cumulative effect will not have a disastrous effect on the over-all transmission performance. (See "Independents' Part in National Transmission Improvement" in this issue).

Defective pulsing has been the suspected cause of many of our "No Ring," "No Answer," and "Wrong Number Reached" traffic reports. As DDD grows and more subscribers dial their own long distance numbers, pulsing irregularities are expected to become a greater source of customer complaints. An economical and effective control over transmission and signaling maintenance is available in the Shewart control charts.

There are two general types of maintenance action used by the telephone industry. Corrective maintenance means doing work after a failure has occurred. Preventive maintenance is work done in anticipation of a failure. Good productivity demands an economical blend of both methods. The control chart is a statistical device that will direct maintenance effort profitably toward the reduction of actual and potential trouble conditions without wasting effort in directions where no trouble is indicated.

Quality Control Charts are used fairly extensively to control the quality of manufactured products. Their use need not be confined as they can be applied to the improvement and control of anything measureable, such as transmission losses or the per cent break of pulses. The application of this method to telephone transmission maintenance was covered in a paper by Pringle and Gaudet presented to the AIEE Summer General Meeting in June, 1957 and published in *Communication and Electronics*, November, 1957.

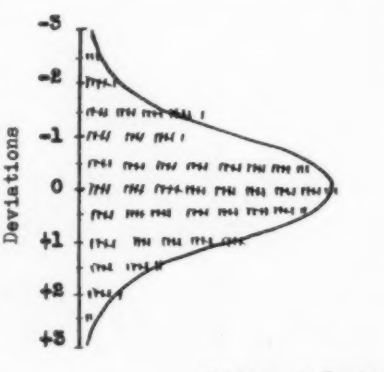


Fig. 1. Illustrating the actual net loss deviations recorded on a number of trunks and a resulting distribution spread.

Application of Charts

In this article, we will outline the application of control charts in the improvement and control of

(1) Trunk net loss deviations.
(2) Per cent break deviations in pulsing circuits.

By deviations, we mean the algebraic amount required to make the circuit meet specific requirements. A circuit having a net loss of —5.0 db. and reading —5.8 db. would need +.8 db. to make it right. If this deviation of +.8 were marked on a chart with all the other circuit deviations, the result might look like *Fig. 1.*

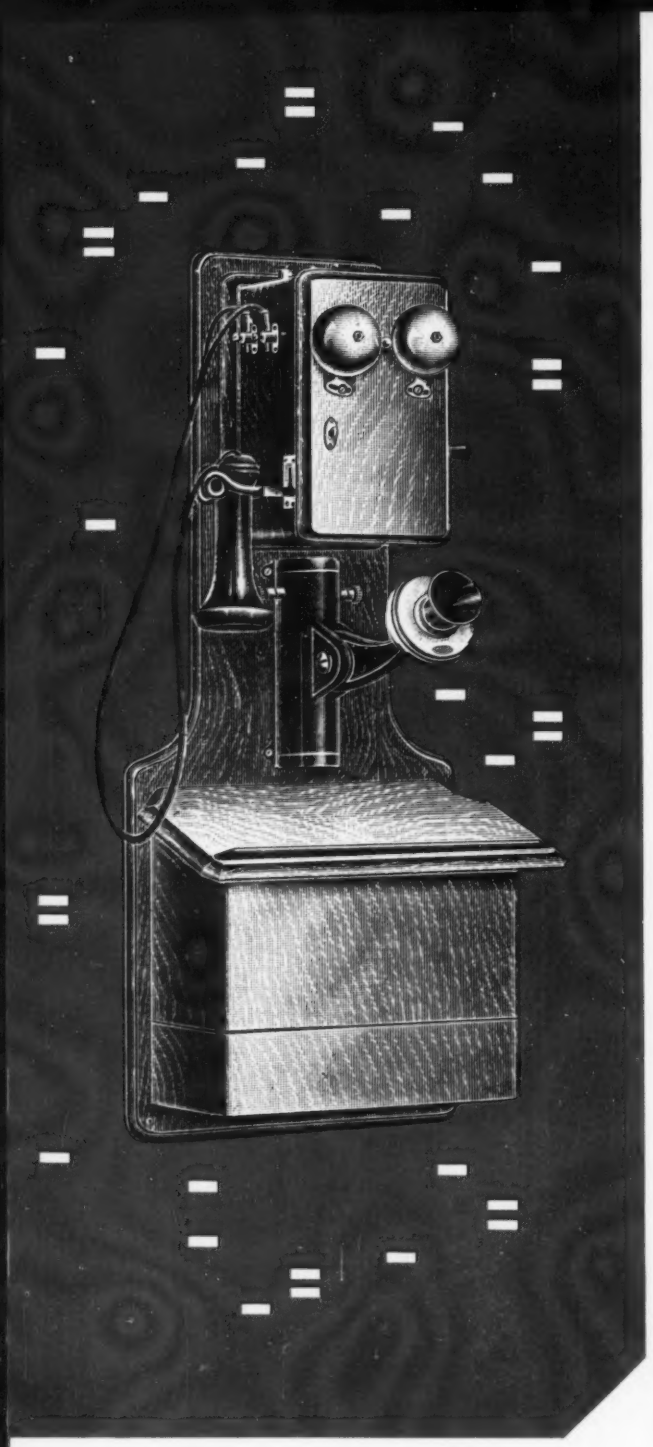
It is our objective to keep the distribution spread of the deviations as narrow as possible; in other words, to keep the standard deviation, which is a satisfactory measure of spread, to a minimum. Generally, there are two basic kinds of causes that contribute to the spread of the distribution.

(1) Chance causes—small independent factors that cannot profitably be found and removed.
(2) Significant causes — definite trouble causing factors that can and should be corrected.

Control charts will enable us to direct

(Continued on page 38)

*Mr. Plaskett is with the Bell Telephone Co. of Canada at Waterloo, Ontario. For 13 years, he has worked in construction, installation and repair departments. Before working on signaling developments, he was responsible for voice transmission maintenance. During this time he was involved in two cuts to VNL.



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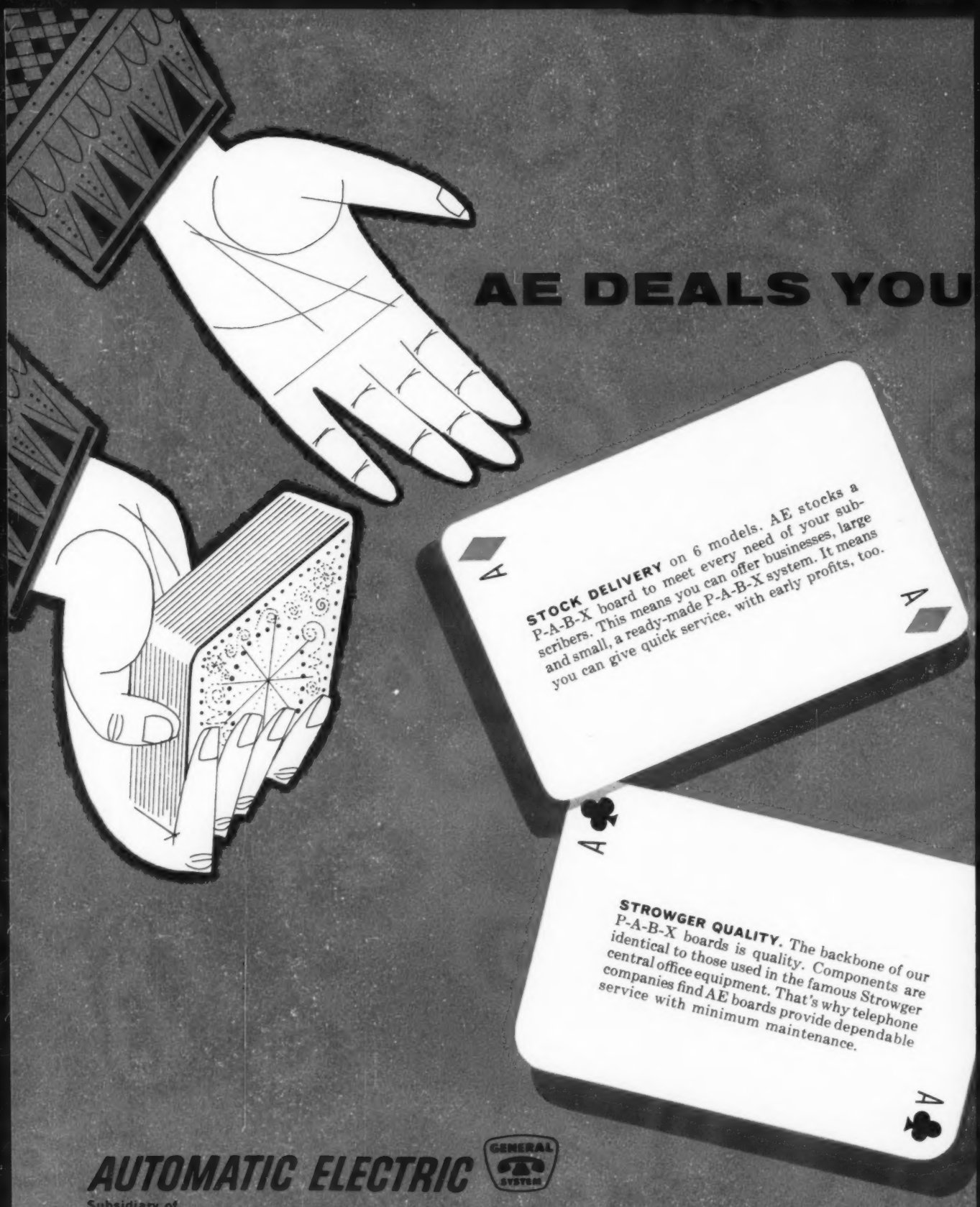
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A

our maintenance efforts along more profitable lines, for if we don't take action when assignable causes are present we will not make headway against our problem. But if we do take action when chance causes alone are present, we are just adding more disorder.

Suppose for example, that the specified net loss of a circuit is —5.0 db., and on a hot day, —5.7 db. is read. If this chance cause were corrected by adjusting the repeater gain for —5.0 db., then when the temperature returns to a normal value, the circuit will be unable to return to normal and will have deviated again. The resulting confusion means excessive work, expense and poor transmission control. Since the quality control charts indicate the circuits affected by significant causes, they can save time and effort and produce a better control.

The circuits to be studied should be divided into rational sub-groups containing circuits as much alike as possible, being more or less identical in their physical makeup. All of the groups would consist of the same number of circuits with the exception of odd, leftover groups. For the sample pulsing study, we will use as an illustration, three circuits on the same

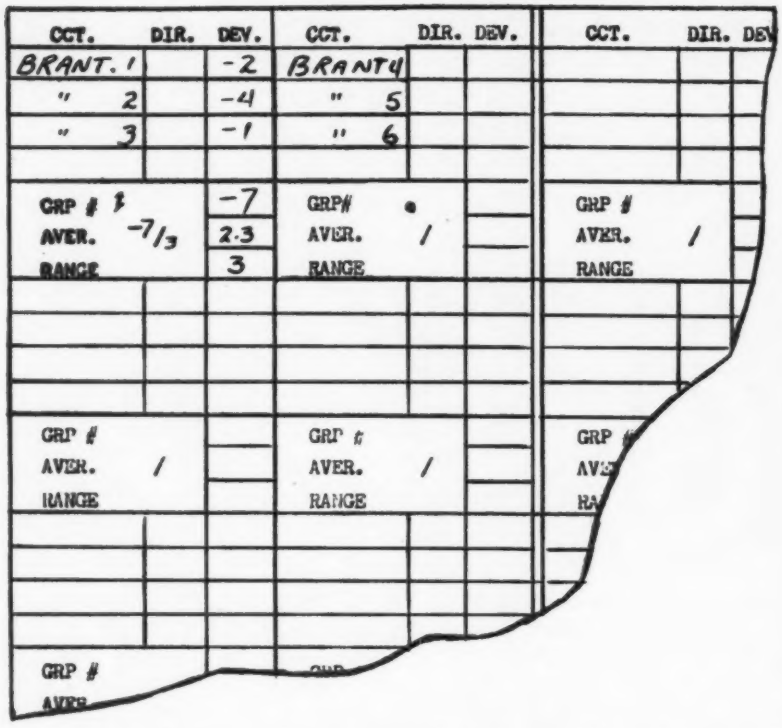


Fig. 2. Showing how range and average are calculated on a work sheet from a group.

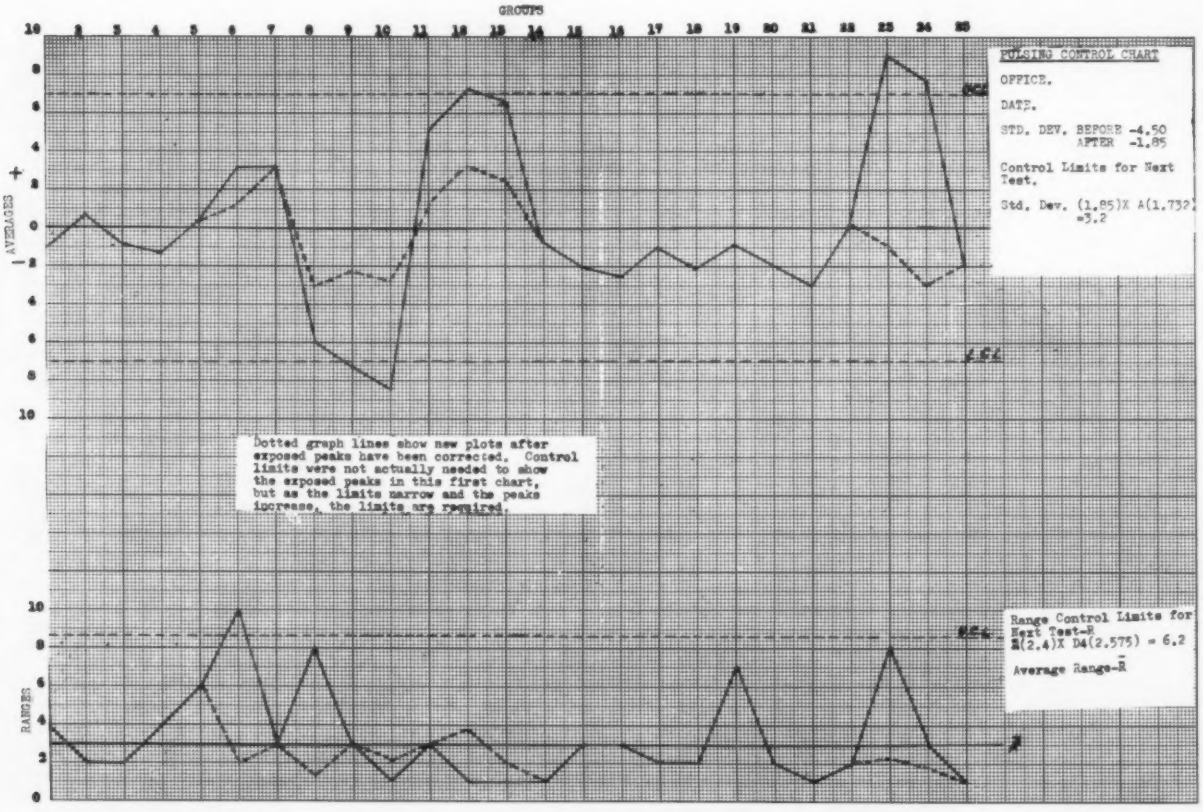

GROUPS
AVERAGES
RANGES
PULSING CONTROL CHART
OFFICE.
DATE.
STD. DEV. BEFORE -4.50
AFTER -1.85
Control Limits for Next Test.
Std. Dev. (1.85)X A(1.732)
=3.2
Dotted graph lines show new plots after exposed peaks have been corrected. Control limits were not actually needed to show the exposed peaks in this first chart, but as the limits narrow and the peaks increase, the limits are required.
Range Control Limits for Next Test-R
R̄(2.4)X D4(2.575) = 6.2
Average Range-R̄

Fig. 3.

NOMINAL WEIGHTS OF FINISHED WEATHER-RESISTANT WIRE AND CABLE

(Pounds per 1000 Feet)

Conductor Size AWG or Mcm	Copper & Copper Alloy Conductors				Aluminum Conductors	
	URC Type Double Braid	URC Type Triple Braid	Neoprene Type	Polyethylene Type	Neoprene Type	Polyethylene Type
Stranded						
2	246	270	248	230	105	87.4
4	155	170	163	143	73.3	53.3
6	103	115	108	91.5	51.5	35.0
Solid						
2	239	260	232	219	92.2	79.2
4	151	164	152	136	64.0	48.0
6	100	112	101	87	45.7	31.7

Sources: American Standards Association Specifications

This table shows

POLYETHYLENE covered line wire weighs less

Because it's the lightest, polyethylene-covered line wire is the easiest for linemen to string up . . . hardest for ice and snow loading, gale-force winds to bring down.

Polyethylene-covered line wire, depending on size and conductor, weighs from 5% to 32% less than other types. That's what the figures in the specifications tabulated above show.

This, of course, is no news to linemen who have strung all types of weatherproof line wire. They may not be able to quote pounds and percentages, but they all know you can't beat polyethylene on weight.

Linemen's Favorite Material

Light weight means easy handling, one of the main reasons polyethylene rates tops with installation crews. They also like polyethylene wire because it's clean . . . free-stripping . . . has a smooth, self-lubricating surface that almost makes pulling a pleasure. And despite the exterior slip, the plastic covering hugs the conductor tightly, doesn't ruffle as it goes over crossarms.

"Built-in" Safety Factor

Polyethylene's lightness provides lasting mechanical advantages, since span loads don't tax supports as much as heavier type wire. This "built-in" weight safety factor pays off when violent storms push aerial construction to strain limits . . . when ice and snow loads topple heavier lines.

An added factor in polyethylene wire's ability to stay up under adverse conditions is its smaller diameter. It offers less resistance to wind, a smaller surface for ice build-up.

Winning Combination

Called the "closest to the ideal covering for line wire," polyethylene is outstanding in other respects too. The shield it forms over wire is continuous . . . tough . . . resistant to aging, weathering, moisture, abrasion by lashing branches. It's good for decades of superior service marked by fewer outages, minimum maintenance.

When you order covered wire and cable, make sure the coating is made with PETROTHENE® polyethylene resins. PETROTHENE polyethylene costs no more, but it gives you premium weather and stress-crack resistance.

Polyethylene's advantages are outlined in an informative new U.S.I. data sheet, "Polyethylene . . . The Best Line Wire Covering." Also available is a data sheet showing properties, applications and specifications of PETROTHENE polyethylene compounds. Send for your copies today.

U. S. Industrial Chemicals Co.
Division of National Distillers and Chemical Corp.
99 Park Ave., New York 16, N. Y.

Please send me:
- ☐ "Polyethylene . . . The Best Line Wire Covering"
- ☐ "PETROTHENE Resins for the Wire and Cable Industry"

Name:_____ Title:_____

Company:_____

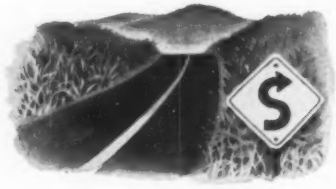
Address:_____

City:_____ State:_____

U.S.I. INDUSTRIAL CHEMICALS CO.
Division of National Distillers and Chemical Corp.
99 Park Ave., New York, 16, N. Y.
Branches in principal cities

Whatever your brush problem

Line?



Roadside?

Right-of-way?

WEEDONE can solve it!

With the right background—Chemical control of weeds and brush has developed along established lines of procedures and practices. Amchem initially pioneered the major advances in the field, has originated many of today's accepted procedures and products for efficient, economical weed and brush control. Your problems are in *experienced* hands when you hand them to Amchem!

With the right approach—Amchem's corps of weed and brush specialists are basically application specialists. Combining comprehensive theoretical and practical experience they are able to offer all industry a realistic approach to *any* weed or brush problem. These specialists have developed a variety of efficient weed and brush eradication programs over thousands of miles of line, roadside and right-of-way areas once choked and inoperable due to infestation.

With the right product—Amchem's tremendously diversified product line is your assurance that the right weed and brush killer is available and will be utilized for your specific problem. Weedone Brush Killers, for example, have been used in the field for years and proven eminently successful in eliminating weeds and brush wherever they are a problem. Why not bring your problems to Amchem?

Amchem and Weedone are registered trademarks of Amchem Products, Inc.

AMCHEM PRODUCTS, INC.
AMBLER, PA.

Please send me copies of your "Brush Control" brochure and full information on the uses of Weedone Brush Killers.

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

AMCHEM

WEEDONE

BRUSH KILLERS

another chemical development of

Amchem Products, Inc.

(Formerly American Chemical Paint Co.)

St. Joseph, Mo. • AMBLER, PA. • Niles, Calif.

composite signaling equipment making up each group. The method of obtaining the completely over-all per cent break readings and their deviations for this study was described in part one of this article (TELEPHONY, Mar. 19).

The deviations of the grouped circuits can be entered on work sheets containing as many groups as are required *(Fig. 2)*. The average and the range (the difference between our highest and lowest deviation) are then calculated. These average and range values can now be plotted on the control chart on their group lines and in the appropriate graph as illustrated in *Fig. 3*.

Calculation of Control Limits

Upper and lower control limits can be determined by multiplying the standard deviation by a factor A. Factor values have been calculated as follows:

Groups of	Factor A	D4
3	1.732	2.575
4	1.500	2.282
5	1.342	2.115

There are several methods of calculating the standard deviation, probably the easiest method is to use a stroke chart as used by the AT&T Long Lines Department to analyze transmission net loss distribution. The individual deviations taken off the groups work sheet *(Figure 2)* are entered on the appropriate lines of the stroke chart. It is not necessary to use the logarithmic feature, a lumberman's count as used in *Fig. 1* will do. When the calculations outlined in the form are completed, a mean value (bias) and a standard deviation (distribution grade) figure will be obtained.

The standard deviation multiplied by the A factor will produce the upper and lower control limits for our first chart. After the exposed peaks have been corrected and relocated, a new "after" standard deviation is calculated and multiplied by the A factor to produce narrower control limits for the next test period.

The control limit for the range chart is calculated by multiplying the average of all the group ranges by factor D4. After the peaks are corrected, the average of all the "after" group ranges multiplied by D4 will provide a more stringent limit for the next test period. Peaks that cannot be corrected at the time of calculation should be left in when calculating the next test limits.

A more detailed explanation of the preceeding calculations can be found in the ASTM manual on "Quality Control of Materials."*

At this point it might be noted that

(Continued on page 61)

NEW TEST METER MEASURES SOUND AND POWER LEVELS

The 45-111B DBM Meter is a portable, battery operated instrument used to measure a-c voltages in the audio spectrum. An internal logarithmic amplifier allows the instrument's large meter to be linearly scaled and read in decibels directly. The meter covers a range of 40 db in ten generously overlapping ranges for maximum accuracy. Signals can be monitored audibly by means of an internal amplifier and a headphone jack on the front panel. Typical applications in the telephony field are: line-loss measurements, noise measurements, and frequency response measurements of lines and equipment.

Two switch-operated "modes" of operation are provided: 1) flat response at all frequencies in the audio spectrum, with readings calibrated in DBM; 2) response only to a restricted band of frequencies corresponding to the F1A-weighting curve, with readings calibrated in DBA.

Continued scale accuracy is assured by a self-contained 1000-cycle calibration oscillator which permits fast, easy calibration of the logarithmic amplifier. The oscillator produces an accurate —50 dbm signal at the meter's input terminals when the front-panel control is in the CALIBRATE position.

Unique design of the DBM/DBA Meter combines complete field portability with laboratory accuracy of ±1 db and an unusual sensitivity which permits measurements of less than zero db. Compactness and lightweight are achieved through the use of low-current-consuming transistors, printed wiring, miniaturized packaging, and a compact, long-life power supply. Instant warm-up characteristics of the all-transistor circuitry assure stable operation and complete absence from drift as soon as the meter is turned on.

Operating power source is a hermetically sealed, rechargeable, nickel-cadmium battery which provides 24 hours of continuous operation. An internal recifier allows recharging by simply connecting the instrument to a 115-volt, a-c line supply with the cord provided. The battery is designed to last the life of the instrument.

For further information, write EMI Division, Consolidated Electrodynamics, 300 Sierra Madre Villa, Pasadena, Calif.

HOW SENSITIVE ...HOW ACCURATE CAN A PORTABLE TEST METER BE?

CEC combines laboratory precision and field ruggedness in its government-approved 45-111 DBM/DBA Meter. Carry this completely portable 10-lb. instrument anywhere to measure signal and noise levels in telephone equipment and systems... measure power in 10 ranges from +30 to −90DBM and from +115 to −5DBA with F. S. accuracy of ±1db... make flat or F1A-weighted readings directly from a large calibrated scale.

The 45-111 uses low-current-consuming transistors and rugged printed-wiring circuits. Internal rechargeable batteries provide 24 hrs of continuous operation.

Other portable CEC test equipment includes this 45-220 Test Oscillator: Weighs only 7 lbs.... furnishes continuously variable frequencies in 4 bands from 15 cps to 150 kc; output is 2 volts rms at 10 ma.

For complete information, write for Bulletin CEC 7002-X3.

Electro Mechanical Instrument Division

CEC

CONSOLIDATED ELECTRODYNAMICS / pasadena, california

A SUBSIDIARY OF Bell & Howell · FINER PRODUCTS THROUGH IMAGINATION

Louisiana Meeting Stresses Bright Prospects

Opportunities are there, delegates told, if challenges can be met.

By Editors,
Monthly News Bulletin,
Louisiana Telephone Association

ROSY PROSPECTS ahead for the nation's business and industry will present challenges to telephone companies which must be met, those attending the 12th annual convention of the Louisiana Telephone Association on Feb. 24 and 25 in New Orleans were told.

It was Mardi Gras time for the city, and in the same spirit, a note of optimism was detected in all the major addresses delivered. The general feeling appeared to be that opportunities for the telephone industry are here. The question is whether its leaders can properly meet the challenges.

Presiding over the meeting was L. C. Turnley of Kaplan, association president.

R. L. Post, public relations director of the Southwestern States Telephone Co., in his address, "Public Relations in the 60's" pointed out that the addition of the 40's war babies to the buying public will make opportunities in the telephone business almost unlimited.

He asked, "Will our prosperity parallel the prosperity of the nation? Or, will the telephone industry fall behind?" At present, he said, "If you think you're getting your share of the customer's spendable dollar, you're likely to be mistaken. In 1930 the average family in Louisiana was spending 2.25 per cent of its spendable income on telephone service, while in 1956, this average Louisiana family was spending only 1.35 per cent of its spendable income with the telephone company.

"Will our share of the dollar continue to decrease during the 60's? By 1970, nine out of 10 families in the United States will have discretionary income. But, will they be spending it with the telephone company?"

Mr. Post expressed a firm belief that the success of public relations programs will determine the success or failure of the telephone industry in getting its share of the consumer dollar. He stated:

"I . . . believe you will find public relations taking on new and increased importance in the telephone business during the 60's. The techniques of public relations will be changing, and it will be imperative that the company manager keep up with them.

L. C. Turnley presided over the convention.

"Through strong public relations, the company will find prosperity as we have never seen it before. Poor public relations—or merely passive, inactive public relations on the part of even the smallest telephone company — will mean disaster.

"The public will not put up with a telephone company that doesn't explain its policies and actions and that doesn't make its public a part of its day-to-day operation."

Mr. Post carefully analyzed the identity of the so-called "public."

No longer, he said, can we simplify the problem by dealing with the hypothetical "John Q. Public." In his opinion, there are four separate publics, each requiring special attention—the subscriber public, the employe public, the stockholder public, and the public of key thought leaders in the community, such as civic officials, church leaders, educators and newspaper editors and publishers.

The needs of each must be carefully taken into account and, in Mr. Post's opinion, the primary effort with each group should be that of keeping them informed—informed of the company's every action, policy, future plans—any action that will affect the subscriber and his telephone service.

He said: "Inform not only through the written word, but inform in person by planning more central office visits and open houses during the new decade. Show off your operation and your business to advantage and you'll have much more satisfied publics.

"Your plan of public relations action with your employes will also include providing a great deal of information

AE-Lenkurt has everything you need for profitable circuit growth...

WHETHER your expansion requirements call for carrier for use on open wire, cable or radio —or for microwave facilities, extension of physical circuits, or any combination of these – the AE-Lenkurt team of experienced *telephone* engineers is able to give you impartial recommendations on the system best suited to your needs. That's because we have a *complete* line, and have no interest in selling one system over another.

What's more, when you deal with us you get service every step of the way. Lenkurt's "Engineer, Furnish and Install" plan covers everything from start to finish. And Automatic Electric's "Follow-Thru" engineering service is yours for the life of the equipment!

If you want the facts on progressive planning for growth, call your Automatic Electric representative, or write:

T. B. Collins, Automatic Electric
Northlake, Illinois

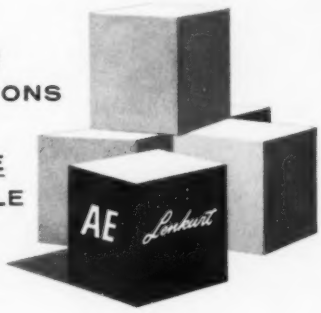
Lenkurt Carrier, for instance...

Lenkurt's 45-class "network-engineered" carrier equipment provides high reliability over the years —meets virtually all multichannel communications conditions.

Type 45A provides 12 channels for open-wire application, short- or long-haul. Type 45C is stackable in 4-channel groups. Either of these systems can be used on the same open-wire pair with a 3-channel Lenkurt 33A or other low-frequency carrier. Type 45BN is a 24-channel system for cable, and Type 45BX provides up to 240 channels for microwave transmission. All 45-class systems are directly interconnectable at carrier frequencies.

Arthur H. Stoutenberg inspects General Telephone Company of Florida's 45BX Carrier installation on the third floor of the Tampa office building.

ALL YOUR COMMUNICATIONS NEEDS FROM ONE DEPENDABLE SOURCE



AUTOMATIC ELECTRIC

Subsidiary of
GENERAL TELEPHONE & ELECTRONICS

Pictured at the Louisiana convention are the association's officers and directors. Seated, left to right, are: Lane J. LeBlanc of Delcambre; William Yarno of Cottonport; L. C. Turnley of Kaplan, president; J. M. Nelson of Welsh, and Earl J. Conrad of Breaux Bridge, second vice president. Standing, left to right, are William L. Henning of Sulphur; John A. Brady Sr. of Golden Meadow; Fred N. Banker of Gonzales, first vice president; Louis J. Peranio of Maringouin; F. E. Hightower of Texarkana, Tex., and C. J. DeBlanc of New Orleans. Absent is Helen S. Prevy of Elizabeth.

about the company, its operation today and its future tomorrow. Use the employe to spread the news about your company throughout the community."

Mr. Post also mentioned advertising, as an integral part of public relations in the 60's.

He stated, "Nine out of 10 purchases made today can be attributed directly to advertising. This is not likely to decrease any during the 60's."

The telephone industry in Louisiana is faced with the problem of keeping pace with the tremendous industrial growth in the state, Ernest S. Clements, a member of the Louisiana Public Service Commission, said in his address, which further outlined the new decade's challenges.

He stated that the Mississippi River, once considered a liability to the state, is now the key which has opened the doors of economic opportunity.

He explained that Louisiana's natural resources give it a great potential and that the state's future success will depend upon sensible use of these resources.

Mr. Clements also stressed that Louisianans owe it to future generations to adopt and carry out conservation measures which will assure maximum realization of the state's potential.

Nationwide, the telephone industry is facing the same problems, Clifford C. Pearce, of Riceville, Ia., first vice president of the United States Independent Telephone Association, stressed.

Mr. Pearce, in his address, "USITA, the Vanguard of Independent Telephony" noted the progress of the Independent telephone industry in this country.

He said: "No one who is a student of our business can fail to be optimistic about the future of the telephone industry. There will be many challenges, many openings for jobs, many opportunities for investment and for profit. There will be opportunities for service in the broadest sense."

In his opinion, the greatest opportunities are yet to come. He stated:

"I personally, feel optimistic about this Independent telephone industry of ours. Although we have made significant strides over the years, there are many—and I am among them—who believe that the brightest era and largest opportunities lie ahead.

"There seems to be no let-up in demand for telephone service. The population of the country is now 177 million. It is estimated that by 1980, there will be 77 million more people.

"At the end of World War II in 1945, the Independent telephone companies of the country had about 5 million stations in service. Today they have more than twice that number.

"Operating as our companies do in many of the suburban areas adjacent to large centers of population, Independent companies have been, and will continue to be, the beneficiaries of shifts in population away from the big cities. This is a trend that is certain to continue as long as there is an environment better adapted to a full and comfortable life."

Relating this to the telephone industry, Mr. Pearce said:

"The circumstances point to many things . . . Among them is the necessity for improved recruitment procedures and means of attracting new employes to our business in competitive labor markets.

"More employes must be trained for technical assignments and executive, management, and supervisory positions; investors must be wooed more than ever to enable plant additions to be made, and expansion and improvements of service to go forward.

"Every advantage must be taken of advances in the communications art. Regulatory commissions must continue to demonstrate a realistic attitude in dealing with necessary rate adjustments so that a favorable investor climate may be maintained.

"USITA is interested in . . . the problems of all Independent telephone companies, little, big, medium, and small. We need you and we like to feel that you need us."

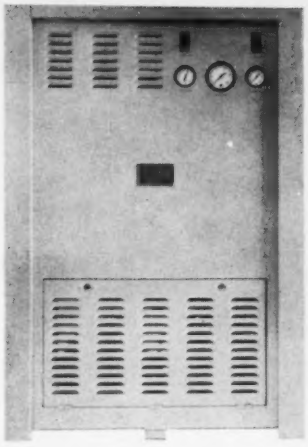
Mr. Pearce discussed the opportunities afforded Independent companies by USITA. He emphasized that in the field of federal legislation, that organization continues to be the industry's watchdog.

He called for the help of the Louisiana companies in continuing the fight for repeal of the federal excise tax on telephone service.

Perhaps USITA's greatest achievement during the past year, said Pearce, was in the area of toll compensation settlements. The agreement reached in 1959—resulting from long negotiations between that organization and representatives of the Bell System—means an annual increase in toll compensation of approximately 12 million dollars based upon 1959 over-all toll traffic volumes.

This accomplishment, he stressed, did

(Continued on page 62)



DRY CLEAN AIR

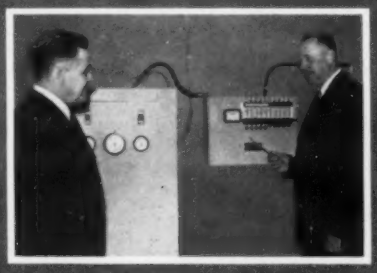
. . . at work for HIGHLAND TELEPHONE Co.

The Highland Telephone Company, of Monroe, N. Y. has recently completed several installations of PUREGAS pressurizing equipment to improve service and reduce maintenance costs on their telephone circuits, serving 11,640 stations.

Highland Telephone thus has become another in the growing number of independent telephone companies across the nation that are capitalizing on the advantages of continuous feed pressure systems to dramatically reduce moisture-caused service difficulties in their telephone cables.

Here, in brief, are a few of the advantages of PUREGAS Cable Pressurization:

- *Lower Maintenance Costs*
- *Better Customer Service*
- *Prompt Notice of Sheath Breaks*
- *Longer Cable Life*



President P. L. Perrone and Plant Supervisor, C. A. Smith inspect their PUREGAS Air Dryer installation.

To find out how a PUREGAS Pressurizing Program can just about eliminate emergencies caused by sheath breaks and moisture damage . . . Check-off the bulletins you would like, and send this page to us with your name and address.

- ☐ Data Sheets on Model 750, 1500, and 5000 Air Dryers
- ☐ "Why Cables Should Be Pressurized"
- ☐ "Desert Dry Air . . . a boom to the Telephone Industry"
- ☐ Cost Comparison . . . Air Dryers vs Nitrogen
- ☐ "Meter Panels for Continuous Feed Pressure Systems"

PUREGAS EQUIPMENT CORP. PEC

78 Oak Street, Copiague, L. I., N. Y.

CHARLEY BUCKENMEYER'S STORY IS TYPICAL

On his farm near Batavia, New York, Charley milks 150 cows and also buys and sells heifers.

Business is brisk. Getting things done takes twenty or thirty phone calls a day, six or eight of them Long Distance.

Up until about four years ago, Charley made and took all his calls on the phone in the house, 100 yards away from the barn. This meant that he spent a good part of every working day just hurrying to and from the phone.

And every time he was called, Mrs. Buckenmeyer had to drop what she was doing and go fetch him.

Then Charley had an extension telephone installed in his barn. That ended the running. In addition, it saved the time spent running, too. If you want to look at figures, the Buckenmeyers' barn extension costs about a penny for every mile of walking it saves.

Charley's story is such a simple, natural demonstration of the benefits of extension phones on farms, that we are featuring it this month in agricultural magazines which go to farmers throughout the country.

In fact, Charley's story is typical of the changing views toward telephone service on today's farms. For he is just one of many farmers we have talked with who have learned that extension telephones are vital in the day-to-day operation of the modern farm.

BELL TELEPHONE SYSTEM

new

Stops

Leakage and Corrosion

The safe low 150°F surface temperature ...

DAMPP-CHASER

DEHUMIDIFYING HEATER

- For all PBX
- Unattended CDO's
- Central Office Equipment

Maintenance free. The lifetime heating element is sealed in a 3/4" aluminum tube. Inexpensive, standard, 1-1½-2 & 3 foot lengths for equipment wide efficient heat distribution. Safe to place anywhere! Half the operating cost of old fashoned, inefficient, dangerous "hot spot resistor heaters."

NO Chemicals Replacements Worry

NO Fire Hazard Personnel Hazard Equipment Damage

No assembly, comes complete with clips. Simply plug in and forget, never needs attention. Immediate delivery! Field tested and proved by one of the South's largest telephone companies.

5 YEAR WRITTEN GUARANTEE

Phone: OX. 3-8271 or write for prices and full particulars.

MANUFACTURED FOR OVER A DECADE BY

DAMPP-CHASER, INC.

HENDERSONVILLE, NORTH CAROLINA

Affiliate: DAMPP-CHASER, LTD, London, England

Courts and Commissions

General of SW Gets Raises At Five Texas Exchanges

The following rate increases became effective in Texas exchanges of General Telephone Co. of the Southwest during February:

	Old	*New*
Bynum, Dial, 67 stations, Feb. 1.		
One-party business	$8.00	$ 9.00
Two-party business	6.50	7.50
One-party residence	4.50	5.00
Two-party residence	3.75	4.25
Four-party residence	3.00	3.50
Jermyn, Dial, 53 stations, Feb. 1.		
One party business	8.50	10.00
Two-party business	7.00	—
One-party residence	4.75	5.25
Two-party residence	3.75	4.25
Four-party residence	3.00	3.50
Miami, Dial, 316 stations, Feb. 6.		
One-party business	8.50	11.50
Two-party business	7.00	9.50
One-party residence	4.75	5.75
Two-party residence	4.00	5.00
Four-party residence	3.50	4.25
Aspermont, Dial, 468 stations, Feb. 21.		
One-party business	9.50	10.25
Two-party business	7.50	8.25
One-party residence	4.75	5.25
Two-party residence	4.00	4.25
Rowena, Dial, 208 stations, Feb. 21.		
One-party business	9.50	10.50
Two-party business	7.50	—
One-party residence	4.75	5.25
Two-party residence	4.00	4.50

Mississippi PUC Resolution Asks Excise Tax End

The Mississippi Public Service Commission has adopted a resolution opposing the federal excise taxes on communication services and asking that they be eliminated after June 30, 1960.

Copies of the resolution have been sent to Mississippi's congressmen, the governor, and key committees of the state legislature.

The resolution, adopted by Chairman Hal Phillips and Commissioners Norman Johnson and W. E. Moore, reads as follows:

"This commission has consistently opposed the continuation of the federal excise tax on all communication services.

"Telephone rates are established by the various regulatory commissions throughout the nation, after careful consideration of all relevent facts, with objectives of the full development of the industry and provision of the maximum service to the public at the least possible cost.

"The levying of federal excise taxes distorts such rates, has a restrictive effect on the use of communication services, is discriminatory, adversely affects the earnings potential of communication companies and thereby impairs the growth and improvement of such services.

"It has long been recognized by regulatory agencies of government at all levels that all federal excise taxes, together with other federal, state and local laws and regulations, place the communications industry in position of competitive disadvantage with other industries not so taxed and which offer goods and services to the general public.

"Operations of all telephone companies, but more especially the smaller ones, are particularly affected by such tax.

"Legislation was enacted by Congress in 1959 terminating such excise tax on local telephone service effective June 30, 1960.

"The Mississippi Public Service Commission urgently requests Congress to disregard all proposals to continue the collection of federal excise tax on local communication services from and after June 30, 1960."

Authorize N. Y. Company to Sell Stock and Bonds

The New York Public Service Commission on Mar. 15 authorized The Walden Telephone Co. to issue and sell 874 additional shares of common stock and convertible debentures totaling $109,400.

The company proposes to sell the stock at $60 per share, thereby procuring $161,840 from the new securities. Of this total, $150,000 is to be used to retire outstanding short-term notes and the balance for financing future construction.

The Walden company provides telephone service through dial offices at Walden, Montgomery, Pine Bush and Wallkill. It proposes to offer the new securities initially to present stockholders, granting each the option to buy one additional share of stock for each five now held and one $100 debenture for each four shares of stock now held.

Deny Tex. Relocation Hearing

The Texas Supreme Court on Feb. 15 overruled a motion by the state for a rehearing on the court's ruling that the state's relocation reimbursement law was constitutional (TELEPHONY, Jan. 16).

Approve Kansas Sale

The Southwestern Bell Telephone Co., it was reported on Mar. 10 was authorized by the Kansas Corporation

Commission to buy the Basehor and Tonganoxie exchanges of the Suburban Telephone Co.

Ask to Sell Stock And Negotiate Loan in Arkansas

The Yell County Telephone Co., Danville, on Mar. 14 asked the Arkansas Public Service Commission for authority to sell 750 shares of stock, to borrow $35,000, and to serve additional territory.

Plans for dial conversion of the company's Ola exchange were reported, a project said to cost $60,000.

The Yell County company serves subscribers through its Havana, Belleville, Danville, Ola, and Plainview exchanges.

Grant Authority to Sell Exchange in Minnesota

The Minnesota Railroad & Warehouse Commission on Mar. 14 granted Mrs. Hazel M. Borgen, owner, permission to sell the property of the Felton Telephone Exchange to the Felton Telephone Exchange, Inc., a corporation.

The Felton Exchange has been serving approximately 287 subscribers.

SW Bell Gets Raise At Texas Exchange

The Odessa (Tex.) City Council on Mar. 8 granted Southwestern Bell Telephone Co. a rate increase at that exchange.

One-party business rates will rise from $9.50 to $10.50, and one-party residence rates from $4.50 to $4.75.

Charges for two- and four-party residence service will remain the same, $3.65 and $3.00 respectively.

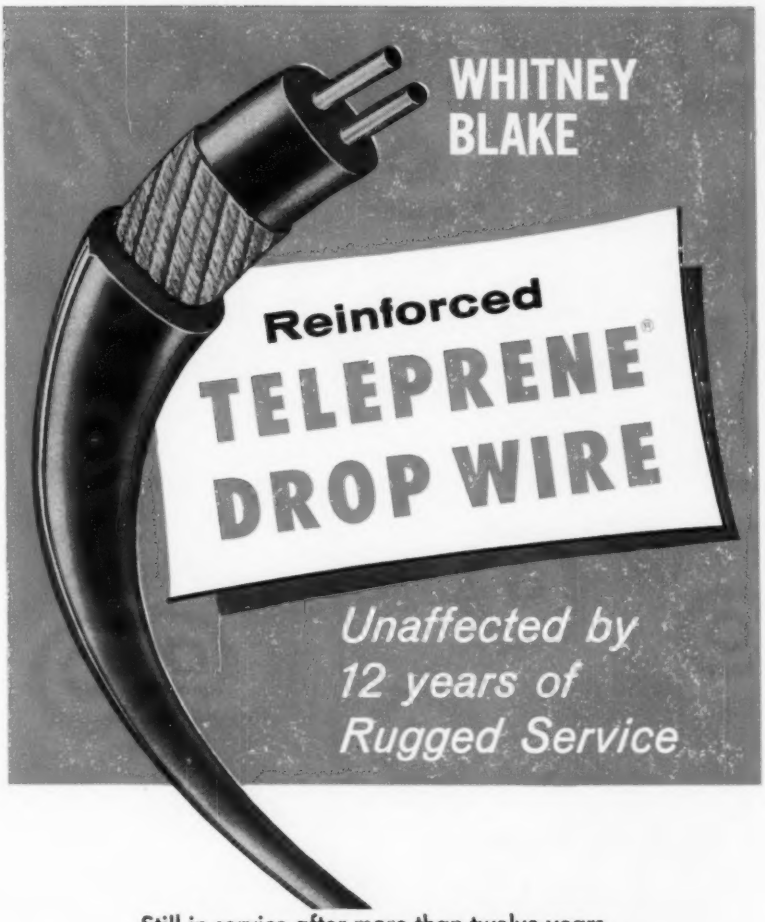
Authorize $1,405,000 Rate Increase to Cal. W&T

The California Public Utilities Commission on Mar. 8 granted a $1,405,000 rate increase to the California Water & Telephone Co., Monrovia (TELEPHONY, Aug. 1, 1959).

The company had sought increases in gross annual operating revenue of $1,292,245. California Water & Telephone serves 155,000 stations through 16 exchanges.

The increase granted by the commission will give the company a 6.4 per cent return on local exchange and intracompany toll operations for the test year 1959; and in the future, will yield 6.25 per cent on such operations after giving consideration to what the commission said is "the declining rate of return resulting from the effects of inflation."

Present and approved rates are as follows:



Still in service after more than twelve years . . . that's the exceptional record of WB Reinforced TELEPRENE Drop Wire . . . and there's only one reason . . . quality. By cutting drop wire replacement to the bone with Reinforced TELEPRENE, Whitney Blake has proved that even if you could get drop wire for nothing, unless it stands up as long as WB TELEPRENE, service calls and replacements would cost you more.

INDEPENDENT

WB

This wire is REA approved

1-8

WELL BUILT WIRES SINCE 1899

WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

CEECO **IT'S NEW!** CEECO

CEECO TERMINALS FOR DIRECT BURIED PLASTIC WIRE AND CABLE

- **Loading one or more pairs as required using Type C152 ready mount assemblies**

LUG—3 TERMINAL WITH ONE PAIR TERMINAL ASSEMBLY AND ONE C152-1 LOADING COIL

★ **PEDESTALS** — TWO PIECE SIX FEET LONG

★ **POLE BRACKETS**—AVAILABLE FOR AERIAL MOUNTING

★ **LOADING** — LOAD ONE OR MORE PAIRS AS REQUIRED USING TYPE C152 READY MOUNT ASSEMBLIES

★ **NON-PROTECTED TERMINALS** — CP16 ASSEMBLIES AVAILABLE IN ONE, TWO, SIX, TWELVE AND SIXTEEN PAIR COMBINATIONS

TYPE CH-3 STEEL "BELL JAR" COVER 8" HIGH

★ **ACCESSIBLE** — FOR TESTING, CABLE OR WIRE SPLICING, CROSS CONNECTING AND SUBSCRIBER DISTRIBUTION

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	Present	*Approved*
One-party business	$7.35-$9.30	$8.60-$10.55
One-party business with extended area service	9.95-11.25	11.20- 12.50
Two-party business	6.00- 7.65	7.10- 8.75
Two-party business with EAS	8.05- 8.65	9.15- 9.75
One-party residence	4.00- 4.55	4.75- 5.30
One-party residence with EAS	4.80- 5.00	5.55- 5.75
Two-party residence	3.65*	4.30*
Two-party residence with EAS	3.95- 4.00	4.60- 4.65
Four-party residence	2.80- 3.35	3.10- 3.65
Four-party residence with EAS	3.35- 3.60	3.65- 3.90

*Offered only in Redlands.

The commission's decision also authorized the company to file a uniform rate for foreign exchange business, one-party line, and PBX trunks between contiguous exchanges.

The one-party measured business foreign exchange rate is $22.60 for 200 messages and the PBX rate is $28.85 for 300 messages.

The decision also allowed the company to withdraw one-party, two-party and suburban business flat rate and PBX service in its Monrovia, San Fernando and Sierra Madre exchanges and to offer, instead, one-party business and PBX trunk service at a basic monthly rate of $7.00 with no exchange message allowance, no later than June 30, 1962.

California Water and Telephone had requested that four-party line flat rate residence service be withdrawn in the Monrovia, San Fernando and Sierra Madre exchanges. The decision directed the company to submit a study and plan for the withdrawal of such service and the offering, in its place, of two-party message rate residence service.

Also authorized was an increase in telephone directory advertising rates in each rate group. With certain exceptions, these rates are increased by making the present rates in each rate group effective in the next lower rate group.

For example, the present rate for a one-quarter column display advertisement in Rate Group A is $1.75 monthly; for the same service in Rate Group B, the present rate is $2.25. Under the newly authorized rates, Rate Group A's rate will be $2.25 and Rate Group B's rate will be $3.00.

Ask Stock Issue in Ark.

The Southwestern States Telephone Co., Brownwood, Tex., asked the Ar-

kansas Public Service Commission on Mar. 10 for authority to issue 40,000 shares of common stock to its officers and employes.

Cal. Company Granted $194,000 Interim Raise

The Coachella Valley Telephone Co., Thermal, on Mar. 8 was granted an interim rate increase by the California Public Utilities Commission (TELEPHONY, Aug. 22, 1959).

The company, which serves 10,000 stations through four exchanges, requested a gross increase of $194,000 in operating revenue. The decision granted, on an interim basis, the full amount of the raise.

The commission stated that: "The record shows that the rapid growth of the area has strained applicant's facilities and that such strain has, for the most part, resulted in poor service. Nearly all subscribers and their representatives who appeared at the hearing testified that were telephone service provided and maintained at good standards, they would not object to the granting of the application."

As a result of this testimony, at hearings in September and November 1959, the commission directed the company to submit plans for service improvement during the years 1959 through 1961. The company submitted the plans requested and showed the effect of the improvements on its 1960 operating results.

The commission staff had made 17 recommendations for the elimination of service complaints and 11 recommendations regarding the filing of reports on service improvement projects.

The plans for service betterment submitted by the Coachella Valley company included the cost of eliminating service complaints and preparing reports as recommended by the commission staff.

This program was adopted by the company as its budget for the years 1960 and 1961 and required the expenditure of approximately 3 million dollars during the years 1959, 1960 and 1961 on capital improvements.

At a hearing on Dec. 29, 1959, the commission staff objected to submission of the matter at the close of that hearing, claiming that the staff had not had an opportunity to test the company's 1960 operating results estimate. The Coachella Valley company, therefore, requested an interim decision pending a final decision.

The interim rates will give the company a return of 5.8 per cent for the year 1960.

The commission stated that failure on the part of the company to place in

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effect the staff's recommendations, or any neglect or unreasonable delay in completing its capital additions program, would constitute grounds for the commission's considering the reduction of the rates authorized in its interim decision.

Present and approved rates are as follows:

	Present	*Approved*
One-party business	$6.50	$12.50
One-party business with extended area service	10.05	16.05
Two-party business	5.25	9.80
Two-party business with EAS	8.25	12.80
Four-party business	4.75	7.25
Four-party business with EAS	6.95	9.45
One-party residence	4.00	5.60
One-party residence with EAS	4.85	6.45
Two-party residence	3.50	4.60
Two-party residence with EAS	4.10	5.20
Four-party residence	3.00	4.00
Four-party residence with EAS	3.30	4.30

Colo. Telephone Booth Burglar Asks Probation

In a Denver *Post* story dated Mar. 15, it was reported that Joe Walter Sanchez, who was convicted of burglary of a coin box in a Golden, Colo. telephone booth, appealed his conviction to the District Court of Golden on Mar. 14 (TELEPHONY, Mar. 12).

The Colorado Supreme Court ruled on Feb. 22 that the telephone booth in which Sanchez was captured constituted a building. He had appealed his case on the grounds that the booth was not a building within the meaning of the state law on burglary, but the state's high court upheld the conviction.

Free on $1,000 bond since the conviction, Sanchez asked District Judge Christian D. Stoner of Golden to withdraw the 3 to 4-year prison sentence which was entered after the conviction, and that he be given probation instead. The hearing was to have been held on Mar. 21.

N. C. Company Asks Raise To Cover Operations, Growth

The North Carolina Telephone Co., Matthews, on Mar. 17 petitioned the North Carolina Utilities Commission to allow it an increase in rates and charges which would produce an additional $71,002 in annual revenue.

The company said its rate of return in 1959 from invested capital was 3.97 per cent and the rate of return on common stock equity was 1.73 per cent.

The proposed new rates, if approved, would earn a 4.92 per cent rate of return, the petition said.

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The additional money would be used to cover operating deficits and for expanding services, the company stated.

The company has its headquarters at Matthews and serves also Ansonville, Marshville, Morven, Norwood, Peachton-Polkton, Wadesboro, Waxhaw, Wingate and Indian Trail.

Rule Independents Can Bill Army Direct For TWX Service

The United States comptroller general has ruled, the United States Independent Telephone Association reports, that the government may obtain TWX service under a contract with a Bell System company and may make payment for this service directly to an Independent company.

In accordance with this decision, the army will continue to order TWX service from the Bell company serving the area in which the TWX switchboard is located.

In those instances in which the Independent and Bell companies involved have agreed that the Independent shall do the billing and collecting for this service, the Bell company is to so inform the army contracting officer.

This information will include the Communication Service Authorization number and the name of the Independent authorized to bill and collect for the service.

The army contracting offices will then arrange to have the following provision included in the communication service authorization, providing for payment for the TWX service charges involved directly to the Independent company by the army:

"Billing and collection for services furnished under this Communication Service Authorization will be made by the (Independent) telephone company and payment will be made directly to that company. Adjustments in billing or settlement for disputed service defects which may be made with the (Independent) telephone company shall be binding on the (Bell) telephone company. Payment in this manner shall operate as a full discharge of the government's liability and obligation for payment of the services rendered."

Ask Rate Raise in Oregon

The Estacada Telephone & Telegraph Co. on Feb. 23 asked the Oregon Public Utility Commissioner for a rate increase.

Ask Rate Raise in Illinois

The Illinois Commerce Commission on Mar. 23 was to have heard the application of the Rossville Telephone Co. for a rate increase at its Alvin, Bismark, Henning and Rossville exchanges.

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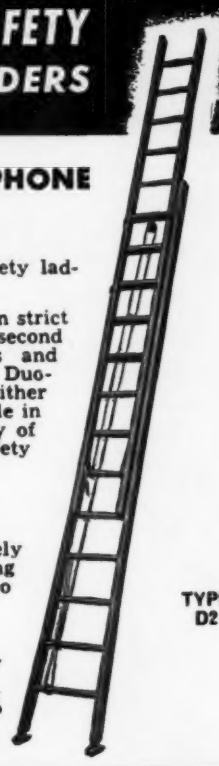

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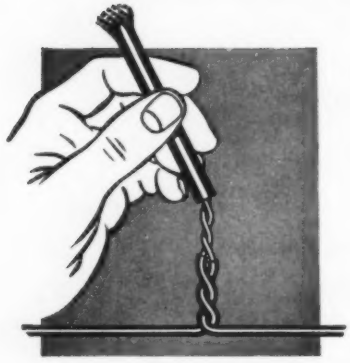

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IN THE NATION'S CAPITAL

Continued from page 18

Decision on Microwave Expected

The FCC is soon expected to announce its long-delayed disposition of requests from the Bell and Independent telephone industries as well as the National Association of Railroad and Utilities Commissioners (NARUC) for a reconsideration of its decision last August about processing private microwave applications. When this decision, which would greatly broaden the conditions for licensing private microwave systems, was announced telephone people, and later the NARUC, asked the FCC to reconsider. Meanwhile the commission put a freeze on various applications for private microwave systems until the question of reconsideration is determined.

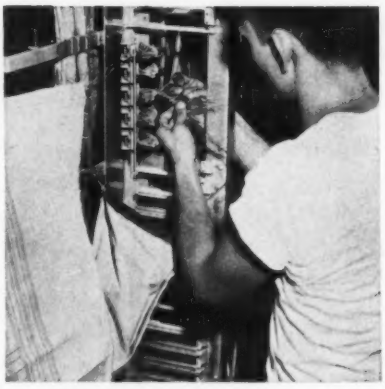
More recently a number of would-be microwave system applicants, including the American Trucking Association, the Association of American Railroads, Minute Maid Corp., and others, have asked the FCC to lift the "freeze." In reply to this, the FCC has announced that the "stay" will remain in effect. The implication there is that the FCC will decide fairly soon whether its original order of last August will be allowed to stand or be reconsidered.

Minimum Wage Hearings

The House Committee on Education and Labor this month began hearings on the Wage Hour Law with a possible eye to increasing the minimum wage and extending coverage of the law. A great number of bills of this nature have been introduced, some of which would increase the minimum wage to as much as $1.50. Under chief consideration, however, is a bill (H. R. 4488), introduced by Rep. James Roosevelt (D., Cal.), which would boost the minimum wage from $1.00 to $1.25.

Several days of hearings have been scheduled and representatives of labor unions and industry are scheduled to testify. Most observers feel that the $1.25 increase proposal stands the best chance of passing during the present session of Congress, although the administration would like to cut this by 10 cents. The fate of the extended coverage provisions, including the small exchange telephone operators' exemption, is still too doubtful for report at this time. The Senate, due to the holdup over the civil rights issue, has not as yet begun hearings on this subject.

The Communications Workers of America on Mar. 16 asked Congress to extend coverage under the Fair Labor Standards Act, to raise the minimum



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wage to $1.25, and to limit the switchboard operator exemption to only those operators who provide telephone service through a switchboard located in the operator's own home. CWA President Joseph A. Beirne gave the union's views in a statement prepared for the House Sub-committee on Labor Standards of the Committee on Education and Labor. The CWA is supporting Representative Roosevelt's bill.

Distribute USITA Engineering Conference Brochure

A brochure describing the 1960 USITA Engineering Conference, to be held at Michigan State University, East Lansing, has been mailed by United States Independent Telephone Association to member companies and alumni of the previous classes (TELEPHONY, Jan. 30). Application blanks were included.

The course, which will be held from July 3 to July 22, is designed to "help engineers of all communication companies secure a maximum utilization of every construction dollar."

Additional copies of the booklet can be obtained from:

Prof. John U. Jeffries, Electrical Engineering Department,
Michigan State University,
East Lansing, Michigan.
Telephone: EDgewood 2-1511, Ext. 2826

BDSA Reports Telephone Growth in Italy, Holland

The Communications Industries Division of the Business & Defense Services Administration, recently reported on telephone growth in Italy and the Netherlands.

The Italian government holding company, Istituto ter la Ricostruzione Industriale (IRI) has acquired the Societa Eserciza Telefonici (SET) which serves southern Italy and Sicily. IRI has allocated $52,330,000 for expansion, which, it is believed, will encourage industrial development, particularly outside of commercial centers, as in the Naples-Sorrento area.

•

The Netherlands' Post Telephone & Telegraph Administration reported 1959 as a "very favorable" year, at the end of which 99 per cent of the Dutch telephone system was fully automatic. By the end of 1960, Amsterdam, Rotterdam, and The Hague will have been included in what is termed international automatic telephone service.

Holland subscribers increased from 300,000 in 1940 to 970,000 by the end of 1959, and demand for installations had increased from 3,000 in early 1959 to 29,500 by the end of the year.

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NATIONAL TRANSMISSION IMPROVEMENT

Continued from page 23

cable until it intersects the 24-gauge line called Point B. Then your cable plant will be made up of 13,800 feet of 24-gauge and 10,200 feet of 22-gauge cable and four H-88 load coils. The high efficiency subsets should be used beyond the "change set" line.

The cheapest and most effective tool is a gauge zone map. Any good large scale city or highway map may be used for this purpose. These maps will reflect the maximum distance, including branch routes, that cable can be extended to reach the maximum loop resistance of the central office supervisory and signaling limit to which this particular plant is operating. It may be readily seen that this map is the basis on which to choose the proper gauge of cables for extensions and the proper choice of telephone instrument to employ in order to get good Local Loop performance at maximum economy.

Interoffice and Extended Area trunks are not switched in the toll network, but they must be designed to operate within reasonable limits to provide good over-all transmission. As a general rule, these circuits should have a maximum loss of not more than 4 db.

Taking a quick look at the distant future, say beyond 1970 *(Fig. 1)*, we see a communication satellite and how it may fit into a worldwide communication scheme. Satellite communication repeaters are presently planned to be placed in circular equatorial orbits at a distance of 22,300 miles from the surface of the earth.

Three of such satellites placed in the same orbital path and spaced 120° apart would give complete coverage of the earth; traveling at the same speed as the earth they would appear to be fixed in the sky to an earth observer. Such satellites equipped with repeater receiver transmitters would receive signals from the earth and retransmit (repeat) these signals to be picked up by receiver stations in some other part of the earth.

Interested commercial companies have indicated they would pay for the satellites, repeater equipment in the satellites and ground transmit and receive equipment, but they could not foresee equipment and funds to place the satellites in orbit. Placing of the satellites in orbit, and maintaining their altitude and position, would remain a responsibility of the federal government at least for the foreseeable future.

Such an arrangement would eliminate the use of intertoll trunks over very long distances, but the toll switching, end-office and local loop still remain with us. With such an arrangement in use, the transmission requirements of the local loop will at least be the same as presently required for Direct Distance Dialing.

Getting out of orbit and back to the problem at hand, one can see a large job before the telephone industry to bring communication facilities over the nation up to the new transmission standard. As the nationwide telephone system takes shape with universal operator toll dialing, customer dialing of station-to-station calls and future person-to-person calls, our customers will increasingly demand this service be made available to them.

Under our free enterprise system, our strength as a nation is derived from what we do together voluntarily for the benefit of all, rather than what we are forced to do. The successful development of the National Transmission Improvement plan will require greater team work between Independent companies, themselves, and between Independent companies and Bell companies. This is a real challenge to the telephone industry to bring about more speed, reliability and quality in the telephone service provided for the American public.

International Aid Group Urged by U. S. C. of C.

The Chamber of Commerce of the United States has recommended that the United States help set up the International Development Association.

The IDA would lend money for long terms at low interest rates to less developed countries which could obtain help for projects such as telephone systems and highways in no other way.

Over a five-year period, the U. S. would contribute 320 million dollars, other industrial countries 430 million dollars, and less developed countries, the equivalent of 250 million dollars.

In the past, the United States has been the sole contributor for this kind of aid, the Chamber said.

The IDA articles of agreement provide that these funds will not compete with private capital or traditional methods of financing.

Local Freedom

"We know that heavy-handed centralization, the loss of local responsibility, leads to the loss of local authority and finally of individual freedom." —DWIGHT D. EISENHOWER, *President of the United States.*

ANSWERING DEVICES

Continued from page 21

The potentials for telephone answering devices are as follows: Primary market, 43,000; secondary market, 9,400; tertiary market, 11,000. The total of 63,400 is 4.2 per cent of total telephones.

North Dakota

The state's 11,200 service units account for the region's total to the extent of 3.6 per cent. There were 6,400 service units without payrolls, and 4,800 with payrolls.

The various potentials for answering devices are as follows: Primary market, 5,800; secondary market, 1,000; tertiary market, 1,400. The total of 8,200 is 4.9 per cent of total telephones.

South Dakota

The total of 13,200 service units is 4.3 per cent of the region's total. There were 7,200 service units without payrolls, and 6,000 with payrolls.

The metropolitan area shown in *Table 2* accounts for 12.1 per cent of all service units in the state.

The potentials for answering devices are as follows: Primary market, 6,500; secondary market, 1,400; tertiary market, 1,600. The total of 9,500 is 4.9 per cent of total telephones.

Nebraska

There were 18,000 service units without payrolls, and 12,800 with payrolls. Total service units of 30,800 represented 10 per cent of the total for the region.

The two metropolitan areas shown in *Table 2* accounted for 36.2 per cent of the state's service units.

The various potentials for answering devices are as follows: Primary market, 16,000; secondary market, 3,000; tertiary market, 3,600. The total of 22,600 is 4.3 per cent of total telephones.

Kansas

There were 24,400 service units without payrolls, and 20,000 with payrolls. The total of 44,400 is 14.9 per cent of the regional total.

The metropolitan areas shown in *Table 2* accounted for 19.8 per cent of the state's total service units.

The various potentials for answering instruments run as follows: Primary market, 22,100; secondary market, 4,500; tertiary market, 5,600. The total of 32,200 represents 4 per cent of total telephones.

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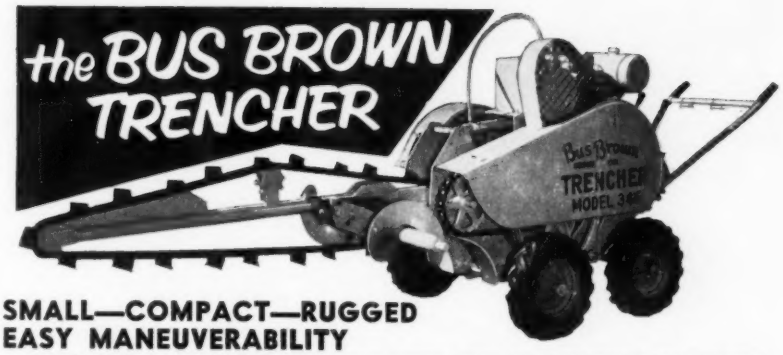
"Real worth requires no interpreter; its everyday deeds form its blazonry." —CHAMFORT.



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SPECIFICATIONS

1. Power — Model AENL Wisconsin engine.
2. Shipping Weight — 750 lbs.
3. Frame — Rigidly Welded ¼" steel plate.
4. Tires — 4x8 Pneumatic, traction type.
5. Digging Chain — Tough Roller Chain with easily detachable Cutters.
6. Bearings — Roller Bearings with zerk fittings. Ball Bearings, permanently sealed.
7. Trenching Width and Depth —
   - 3 inches wide up to 5½ feet deep.
   - 4 inches wide up to 3½ feet deep.
   - 6 inches wide up to 2½ feet deep.
   - (Obtained by different length booms and boom control).
8. Self-Propelled — Drives on all four wheels while digging, rear wheels while in transport gear.
9. Hydraulically Controlled Digging Boom.

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The Neale Troubleshooter's tone is an inexpensive, easy to use instrument, for talking and locating trouble in telephone cable.

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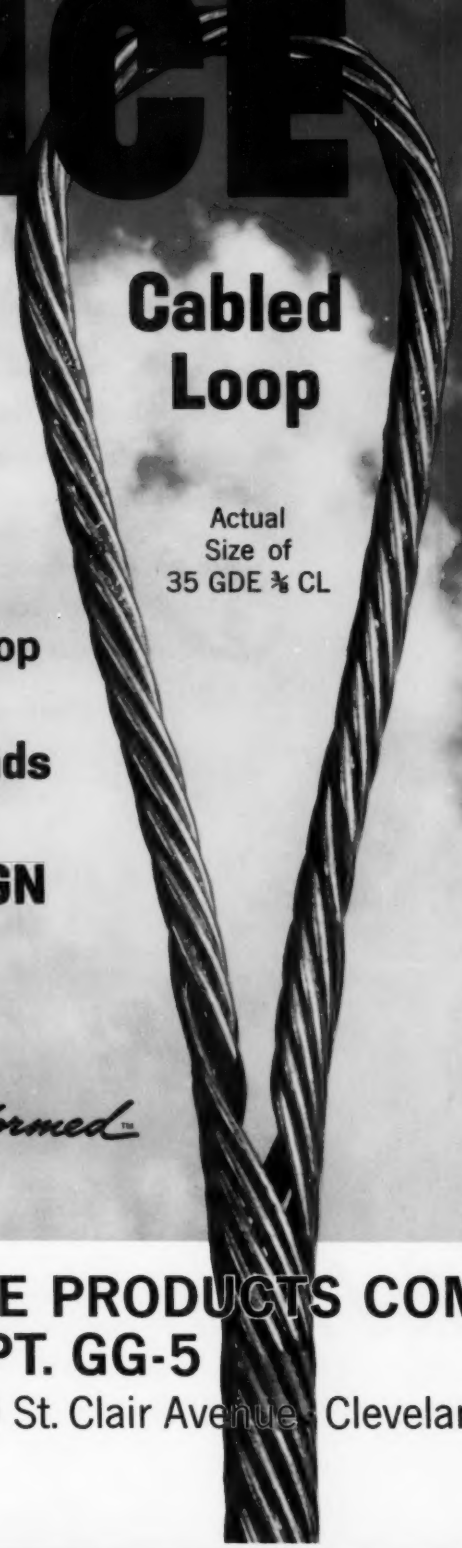

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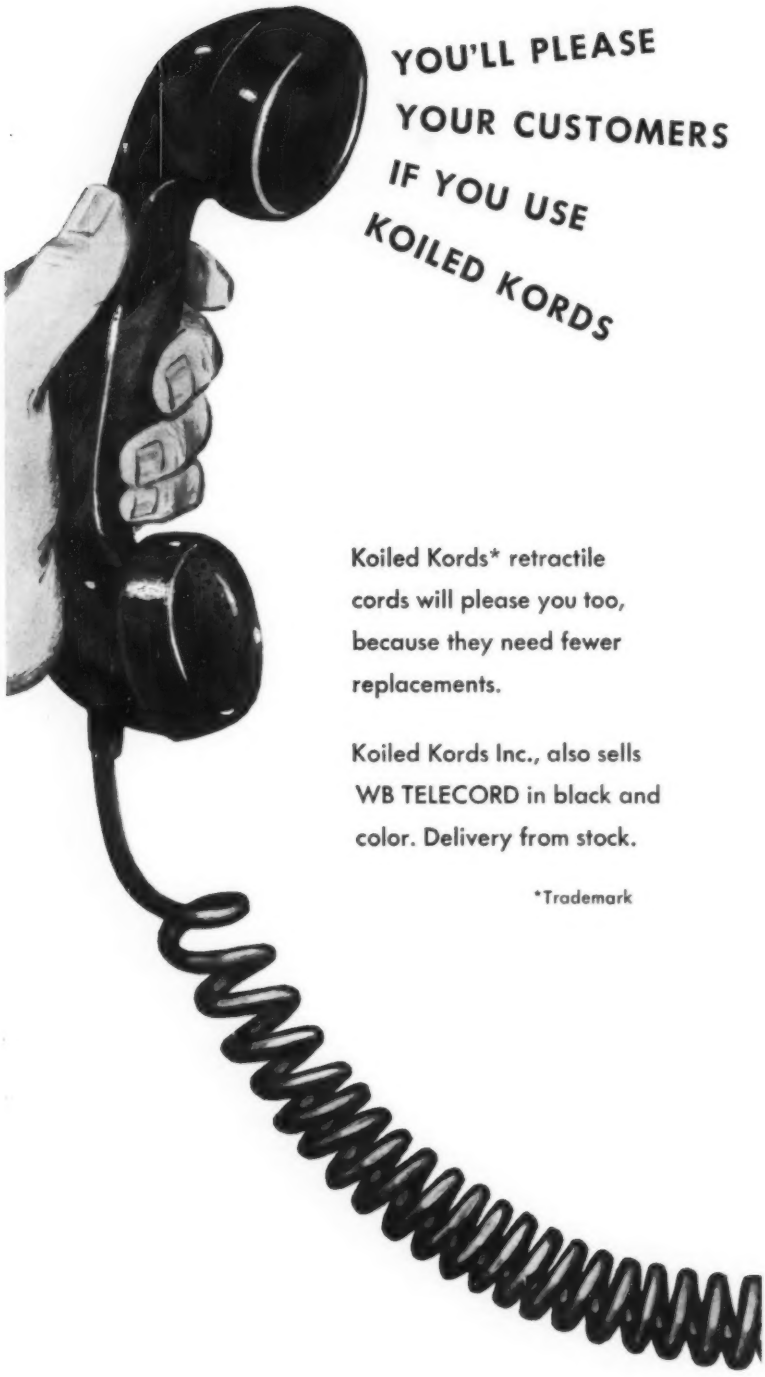

Koiled Kords INC.
A subsidiary of Whitney Blake Company
New Haven 14, Connecticut

THE OPERATOR'S CORNER

Concluded from page 32

be made within an hour or (other interval specified locally), be placed?

(2) Where should calls on which attempts are not due, within an hour or (other interval specified locally), be placed?

(3) How often should tickets be inspected?

(4) How should cancelled tickets on which word has been left be placed?

(5) How should cancelled tickets on which word has not been left be placed?

Answers to questions are on page 64.

United Utilities Had 64% Dial Telephones at '59 End

The United Utilities System had a gain of 14,980 stations in 1959 after giving effect to the sale of 18 exchanges with 4,091 telephones in Missouri and Kansas, the system's annual report revealed. The total number of telephones served was 466,607 (64 per cent dial-operated) against 451,302 (44 per cent dial-operated) at the end of 1958.

In 1959, 42 exchanges serving more than 100,000 telephones were converted to dial operation, C. A. Scupin, president, said. A year before, conversion of 31 exchanges involved about 21,000 telephones. This year it is planned that 60 exchanges will be converted to dial, and this will bring the total of dial telephones to 77 per cent.

Operating revenues of the system last year amounted to $42,442,240, compared with $38,151,477 a year before. Of the $4,290,763 increase in revenues, the telephone division provided $3,725,337 of the gain.

Consolidated net income available for common stock and surplus in 1959 was $4,921,303, equal to $2.09 a share on the average number of shares outstanding. In 1958, earnings were $3,724,699, or $1.67 a share on a smaller number of shares outstanding.

Expenditures for gross property additions amounted to $20,028,817, with telephone operations accounting for 95.5 per cent. The 1960 program calls for gross additions of about 25 million dollars, a record construction program, Mr. Scupin said. Total investment in fixed assets as of Dec. 31 was $152,135,209, compared with $138,916,308 a year before.

Mr. Scupin revealed that negotiations are nearing completion for the acquisition of a telephone company in the Pacific Northwest that will add 4,800 telephones to the system. He also said the management is continuing to "pursue other avenues for strengthening and enlarging the system."

PULSING PLUS

Concluded from page 40

certain groups are less stable than the rest. There may be carrier facilities, for example, that could better be observed if they were removed from regulated repeatered circuits and studied separately.

In our pulsing study example in Fig. 2, the groups from four to 10 consisted of circuits from small distant manual offices. The excessive deviations were traced to defective switchboard dials. The 11 to 13 groups were traced to distant senders outpulsing below limits. Note that a plus deviation was required to bring them to zero. The next several groups are slightly biased, but still within limits. No time was spent on them during this study. Groups 23 and 24 represented an improper testing method from a crossbar office.

The ranges graph reflected the peaks in the averages graph in this study, but any peaks remaining would have been similarly investigated.

The standard deviation figure gives an indication of progress. The figure should become steadily smaller until a value of less than one is obtained. Some offices like to convert the bias and standard deviation figures into a more familiar index figure. Our first pulsing study indicated a "before" standard deviation of 4.5, the latest study, nine months later, indicated a 1.0 value.

Net loss transmission measurements vary much more than pulsing and require more frequent test periods. After an investigation, it is necessary to determine the cause of persistent irregularities. The results of such investigations often result in improved test methods or equipment.

The preparation, calculation and interpretation of the quality control charts is a challenge to the craftsman responsible and usually results in added job satisfaction and a keener interest in transmission and signaling maintenance.

*(Special Technical Publication 15-C of the American Society for Testing Materials, 1916 Race St., Philadelphia. $2.25 per copy.)

CORRECTION

It was stated incorrectly in TELEPHONY's Feb. 20 issue that Z. M. McColloch, who has joined C & D Batteries, was *formerly* associated with Robert H. Welf & Associates. Mr. McColloch is still associated with Welf & Associates, C & D representatives.

KOILED KORDS IN COLOR ADD BEAUTY TO COLORED TELEPHONES

Koiled Kords* retractile cords in new attractive colors are brighter, smarter and more pleasing than ever.

Koiled Kords Inc., also sells WB TELECORDS in black and color. Delivery from stock.

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Model TBM Mast provides complete service entrance facilities for outdoor telephone booths with the definite plus advantages of lower cost and easier installation. Raises power lines for specified ground clearance.

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LOOKS BETTER The TBM Mast is engineered for the job. Adds to the appearance of any booth.

LASTS LONGER Heavy gauge steel tubing used throughout for life-time service. Only heavy duty fittings used.

COSTS LESS Actual installations show savings up to two-thirds over conventional installations.

REMOVABLE. Can be moved from one location to another. Simply disconnect lines and pull mast out of ground sleeve.

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LOUISIANA MEETING STRESSES BRIGHT PROSPECTS

Continued from page 44

not come easily. It resulted from perseverence and hard work by representatives of the association who were well prepared and dedicated in their efforts.

Mr. Pearce made a direct appeal to non-member Louisiana companies to become a part of the national organization.

He closed, emphasizing the importance of each link in the vast telephone industry, and noting that leaders of the small, as well as of the large companies, should always consider themselves part of one network.

The REA's role in helping companies to take advantage of opportunities was cited by Ralph J. Foreman, deputy administrator of the Rural Electrification Administration.

He said, in his talk, "Our Mutual Objectives," that Louisiana's record in providing service is an example of the kind of foresight that has made rapid expansion possible in the telephone industry.

Speaking about Louisiana REA loans, specifically, he stated:

"Your REA loans amount to more than 16 million dollars. About 13 million dollars of that has already gone into 55 modern dial exchanges and hundreds of miles of new line. More than 32,000 subscribers will benefit from REA loans made to your companies.

"Already you have paid back to the government more than one million dollars in principal and interest on the loans. Not a single one of our Louisiana borrowers is behind schedule in debt service payments."

He emphasized that REA's real interest is in people—the telephone subscribers. He explained that service to farm families is the principal objective.

He pointed out that 10 years ago, less than one-third of the nation's farms had telephones, and today the figure is about two-thirds.

The 1950-60 decade has been by far the greatest decade ever in rural telephone expansion. This, Mr. Foreman said, was made possible by REA loans, technological advances, and the cooperation of various segments of the telephone industry.

Concluding, Mr. Foreman reminded the group that where federal funds are involved, serious duties evolve upon both borrower and lender to see that they are wisely spent.

Competition is still another challenge facing the telephone industry, according to F. M. Fister, chief engineer for Southern Bell Telephone & Telegraph Co. in Louisiana.

Mr. Fister, whose speech was entitled, "The Challenge of Competition, Innovation," began by dispelling the popular inaccuracy that the telephone industry is non-competitive by virtue of its being a regulated industry.

Two vital areas, in his opinion, are very competitive and the industry's success in meeting this competition will determine the extent of its future economic gains.

Those areas are: (1) The competition with the products and services of other industries for the customer's dollar, especially so since more optional services are being offered; and (2) competition in the money market for the investor's dollar.

In competition for the investor's dollar, Mr. Fister pointed out that unregulated industry has financed more than half of its capital growth since the war through retained profits, while regulated industry has done less than half as well.

New capital has been required because of the tremendous expansion programs demanded by the public. Facts bear out, Mr. Fister said, that although the telephone industry must compete with unregulated industry for investors, it is not allowed earnings commensurate with other enterprises having corresponding risks.

He described as follows the demands which must be met in the coming decade, and the magnitude of the problems facing the industry:

"Already the war babies are becoming adults and establishing homes and using telephone service. This exploding population will expect and will have a better standard of living and will want more and better telephone service than their parents had. We expect long distance messages will more than double in the next 10 years, and they will have to be faster, too.

"The business man is almost certain to want in-dialing to his PBX extensions so he can eliminate or reduce the expense of the operator. And we can expect the tempo of the 60's to increase to the point where it will be necessary to transmit voluminous data over electronic channels.

"We might also expect the business man to become alarmingly impatient if he cannot get all the services he needs trouble-free and promptly.

"There are quite a few non-communication companies today that would like to provide a considerable part of their communications themselves without depending on the common carrier, and it looks like the FCC is going to give them permission to build their own private microwave radio systems.

"This is a new kind of competition

but I am confident we can meet the challenge by innovation. With our technical know-how and our backbone plant, the acquiring of a new concept of time, the application of new methods, and the possible revision of some rate structures, we should be able to provide one or a hundred communication channels more economically than any competitor."

Automatic toll ticketing was the subject of an open forum discussion presided over by William Henning of Sulphur. Panelists were: Gilbert Gray of Automatic Electric Co.; J. M. Blackhall of Kellogg Switchboard & Supply Co.; R. W. Michael of Service Bureau Corp., and William Riley of Stromberg-Carlson Co.

The convention passed two resolutions as follows:

(1) A recommendation that a committee be appointed to study and explore the possibility of establishing more uniformity in rates between companies for multi-party rural service.

(2) A petition to congress to leave undisturbed the July 1, 1960 termination date for the excise tax on local telephone service; and further, to set a termination date for the tax as applied to long distance service.

Named a member of the association board of directors was Helen S. Prevy of Elizabeth. Re-elected were John A. Brady Sr. of Golden Meadow and Lane J. LeBlanc of Delcambre.

Other directors are Fred N. Banker of Gonzales, Earl Conrad of Breaux Bridge, C. J. de Blanc of New Orleans, W. L. Henning of Sulphur, F. E. Hightower of Texarkana, Tex., J. M. Nelson of Welch, Louis Peranio of Maringouin, L. C. Turnley of Kaplan and William Yarno of Cottonport.

Re-elected by the board as officers are: President, Mr. Turnley; first vice president, Mr. Banker; second vice president, Mr. Conrad. Secretary-treasurer is Earl Edwards of Marksville.

Myrick Joins General of Cal. Carroll Is NW Vice President

The transfer of Marvin L. Myrick, operating vice president, General Telephone Co. of the Northwest, and the promotion of Walter E. Carroll, general plant manager, to the position of operating vice president was announced recently by A. J. Barran, president of the General of the Northwest company.

Mr. Myrick will assume the duties of assistant division manager of the Long Beach division of the General Telephone Co. of California. The Long Beach exchange is the largest Independent telephone exchange in the nation, Mr. Barran reported.

Mr. Carroll has been serving as general plant manager for the Northwest

NEW ISSUE

This new issue of Common Stock is being sold to the general public by a group of investment dealers, including the undersigned. The offering is made only by means of the official Prospectus.

775,000 Shares

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Common Stock

Price $73.625 per Share

You are invited to ask for a Prospectus describing these shares and the Corporation's business. Any underwriter qualified to sell securities in this state will be glad to give you a copy.

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A. C. Allyn and Company Incorporated — Robert W. Baird & Co. Incorporated — Blair & Co. Incorporated — Clark, Dodge & Co.

Dominick & Dominick — Estabrook & Co. — Hallgarten & Co. — W. E. Hutton & Co. — F. S. Moseley & Co.

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March 15, 1960

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company since November 1958. He joined the General system in 1937 serving as lineman and district plant superintendent in Johnstown, N. Y. and later as safety director. According to Mr. Barran, he will continue to perform the duties of general plant manager for an interim period.

Mr. Myrick joined General Telephone Co. of the Northwest on Apr. 1, 1948, as cost studies engineer in the company's commercial department. He holds a MBA degree from Harvard Graduate School of Business Administration. He is a Major in the Air Force Reserve.

Translation Service Offered In W. Germany on G.B. Calls

A service which will enable German businessmen to call Great Britain or Ireland, without being troubled by the language barrier, began operations on a trial basis in Bonn during the week of Feb. 15.

Called "Tel-Interpret," German Telephone Interpreting Service, it will allow a German-speaking individual to expound in his native tongue, while, by means of simultaneous interpretation, his words are received in English at the other end of the line.

A small additional charge per minute of conversation will be made for these calls, according to the West German *Bulletin*. If the service is satisfactory, it will be extended between the West German Federal Republic and other countries.

Answers To Questions On Page 60

(1) Place such tickets on the table top or keyshelf, arranged in order of their attempt time, face downward with the earliest on top.

(2) Place such tickets in separate compartments grouped by alphabetical sub-division, if necessary, to keep the separate packs of reasonable size.

(3) Tickets should be inspected frequently. Move to the keyshelf those tickets on which the next attempt will be due within an hour or (other interval specified locally).

(4) Place such tickets in separate compartments according to leave word operator numbers and further grouped by alphabetical sub-division, if necessary, to keep the packs of reasonable size.

(5) Place such tickets in a separate compartment.

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for keeping that new look on your telephone instruments—black and colored.

NEW General Telephone Cleaner

After two years of hard work by our chemists, this product has been perfected. It will remove all stains from the new plastic telephones . . . does not affect the cases in any way . . . is non-caustic, non-corrosive and non-inflammable . . . will not injure hands using it . . . makes cases look like new

An Ideal Pair

New General Telephone Cleaner coupled with Magnolia Glayz-It Telephone Refinisher have been demonstrated in over 60 exchanges with the result: orders placed promptly. Care to place yours now?

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Bell Telephone of Canada Replies to Independents

The Bell Telephone Co. of Canada has issued a reply to charges made in a brief filed with the Canadian Minister of Transport asking the Minister to investigate and correct certain inequities existing between the Independent telephone companies in Ontario and Quebec and the Bell company (TELEPHONY, Mar. 5).

Bell Telephone of Canada has issued the following statement:

"The appeal to the Minister of Transport which the Independents refer to was made in a letter dated Jan. 21, 1958 from the then president of the Canadian Independent Telephone Association, James W. Thompson and subsequently the C.I.T.A. brief was referred to us.

"The Bell Telephone Co. of Canada thoroughly investigated Mr. Thompson's claims and replied to the Minister on Aug. 6, 1958 with a full answer to these points. We understand that a copy of this reply was sent to Mr. Thompson by the Minister in October, 1958."

More specifically, the Canadian Independent Telephone Association made two points:

"(1) That they are not given their fair share of revenue for long distance calls which originate and terminate in their territory, and are forced to accept long distance rate schedules determined by Bell.

"(2) That Bell invades their territories thus creating confusion and loss of revenue for the Independent operators."

In reply to these allegations Bell makes the following points:

"(1) On the matter of division of long distance revenues between companies, the telephone industry has, over the years, set up plans for the division of revenues which recognize the cost of providing the service and the investment in the facilities used. Bell believes that this approach to the division of revenues is fair to all parties. . . .

"(2) It is Bell's policy to respect territorial rights of other telephone companies as established by the provision of local telephone service in a specific area. Bell has, in fact, refused many requests for its service in territories served by Independent systems.

"(3) Bell's policy is to encourage Independents to stay in business, and the company gives them every assistance toward this end. The company has recognized for many years the importance of the Independent industry now serving more than 300,000 telephones in providing an integral part of the over-all service in the provinces of Ontario and Quebec. In fact, the company has maintained as part of its organization a group who work with Independent companies toward the improvement of the over-all service by offering assistance based on access to

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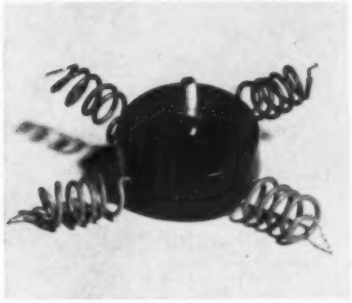

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broad experience and knowledge on current communications problems and information about new developments. All this work is done without cost to Independent companies."

Independents' 1959 Station Gain 5.9 Per Cent

The United States Independent Telephone Association in its Mar. 18 letter, announced that the country's Independents had a station gain of 5.9 per cent in 1959; and that these companies now serve a total of 10,785,000 telephones.

The latest official statistics, as of Dec. 31, 1959, compiled by the USITA show that the Independents' total plant investment during 1959 increased from $3,187,050,000 to $3,630,298,000.

Because of mergers and consolidations, the number of Independent telephone companies decreased from 3,876 to 3,560.

The gross revenues of Independent companies increased from $808,800,000 to $881,832,200, and the number of stations increased from 10,184,800 to 10,785,000, a gain of 600,200, or 5.9 per cent.

Eighty-five per cent of the Independent telephones are now dial operated.

A comparison of the Bell System and the Independent telephone companies as of Dec. 31, 1959, shows the following figures:

	Bell System	*Independent*	*Total*
Total telephones	60,110,000	10,785,000	70,895,000
Number of operating companies	23	3,560	3,583
Number of exchanges	7,050	10,760	17,810
Investment in telephone plant	$22,847,768,000	$3,630,298,000	$26,478,066,000
Gross revenues	$ 7,571,536,000	$ 881,832,200	$ 8,453,368,200
Number of employes	597,100	100,000	697,100

ITT U. S., Foreign Report Shows Record 1959 Gains

The consolidated sales and revenues and consolidated net income of International Telephone & Telegraph Corp. reached record levels in 1959, according to the company's annual report mailed to stockholders recently.

The company and its subsidiaries had consolidated world-wide sales and revenues of $765,639,896, of which $706,411,878 was derived from sales of products and services and $59,228,018 from telephone and radio operating revenues. The year 1959 showed a gain of approximately 11 per cent over the comparable total for 1958, giving the system its highest sales and revenue year in history.

Consolidated net income was $29,035,688, approximately 9 per cent higher than in 1958, which is an earnings record. There was an increase of 803,394 shares of ITT stock outstanding during 1959, due principally to conversions of 4⅞ per cent debentures, so that net income per share increased to only $1.90, compared with $1.85 per share in 1958.

Dividends of 25 cents per share were declared on the capital stock during each quarter of 1959, the $1.00 total comparing with 90 cents per share for 1958.

Increased yield from ITT's telephone and radio operating properties in Latin America was more than sufficient to offset the decline in earnings of the Cuban Telephone Co., H. S. Geneen, president of ITT, said.

He reported that the company continues to work constantly with representatives of the U. S. and Cuban governments to improve the situation in regard to the Cuban Telephone Co., which has remained in a state of "intervention" since Mar. 4, 1959.

Orders on hand throughout the ITT System at the end of 1959 were $551,000,000, the highest in company history.

Provision for U. S. and foreign taxes totaled $45,342,936 compared with $42,409,587. Total outlays for plant and equipment amounted to $87,000,000 in 1959 compared with $72,000,000 in 1958.

A comparative statement of earnings follows:

	1959	*1958*
Sales	$706,411,878	$635,153,122
Telephone and radio operating revenues	59,228,018	52,298,323
Total sales and revenues	765,639,896	687,451,445
Net income	29,035,688	26,600,168
Net income per average share	$1.90	$1.85*
Dividends per share	$1.00	$ .90*
Orders on hand	551,000,000	511,000,000

*Adjusted for 2-for-1 split.

J. F. Novak Joins AE As Credit Manager's Aid

Joe F. Novak has been named staff assistant to the credit manager of Automatic Electric Sales Corp., Northlake, Ill.

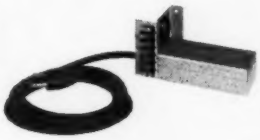
In his newly created position, Mr. Novak will work closely with operat-

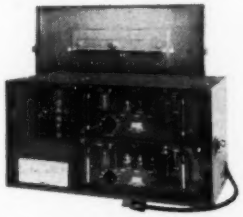
Get on the Altec line for dependable telephone equipment

FOR THE BIG GAIN in performance, dependability and servicing ease, check the Altec line of telephone amplifiers and equipment. Precision engineered to meet the most exacting specifications of the industry, Altec products are compact in design for minimum use of space, versatile in application, outstanding in quality and reliability. Check Altec for your needs in today's most advanced telephone and paging equipment.

The 447-A Amplifier is the exact equivalent of the vacuum tube type repeater and its gain, power handling capacity, frequency response, plug-in features and physical size are identical. The drain from 20 volt source is also made identical at 50 ma by the addition of a bleeder resistor to the basic amplifier. It does not require the 130 volt supply needed with the vacuum tube type repeater. For detailed information write for Altec Lansing Bulletin #12966-2.

The 533 Power Supply is designed to fit within a 105-B Apparatus Box. The power supply bracket includes the required socket and space to mount a single ALTEC transistorized repeater type 449, 450 or 453-A and, at reduced power, the 447-A. Operating from 117 volts AC the unit delivers 20 v at 25 ma. Write for Bulletin #13132.





The S-17 Amplifier System is designed for the highest quality program transmission over telephone circuits. A single portable and rack-mountable housing contains two (2) amplifiers and accessory jacks and equalizers so that two (2) complete circuits can be maintained without cross talk. Write for Bulletin #12835.

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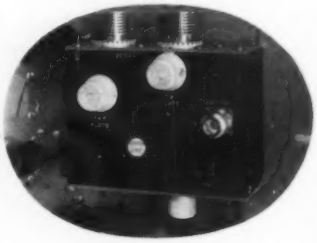

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ing companies to establish financing programs for new equipment purchases, as well as advise and consult with customers on their outside plant requirements.

Mr. Novak has had a wide range of experience in the telephone industry. Prior to joining AE, he served as manager of the Bremen (Ind.) Telephone Corp.

He was also owner and manager of the Lookeba (Okla.) Telephone Co.

From 1952-55, he served as owner and manager of the Yates City (Ill.) Telephone Co. and was formerly a telephone technician for Creole Petroleum Corp. in Venezuela.

Novak also served as an installer for four years with Automatic Electric Co. during the 1940's.

He attended Bradley University in Peoria, Ill., and served as a radio officer in the Merchant Marine from 1943-46.

Latin American Countries Chronicle Telephone Progress

Communications improvement programs are in progress in much of Latin America.

In Mexico, Telefonica Fronteriza S.A., headquartered in Tiajuana, is installing 1,000 telephone lines in its central office. Installation is expected to be completed during April. Several months later, the company plans to install, 1,400 more lines in the same office.

Work has started on a subcentral office in the Colonia Hipodromo, where an additional 2,000 lines will be installed by about Sept. 1.

In Ensenada, the installation of 4,000 lines is completing a conversion from manual to dial service, with full cutover expected to be effective by mid-1961. The company is purchasing complete equipment for 7,400 lines.

•

In Peru, Cia. Nacional de Telefonos, Ltda., Lima, is engaged in a long distance expansion program. Begun in

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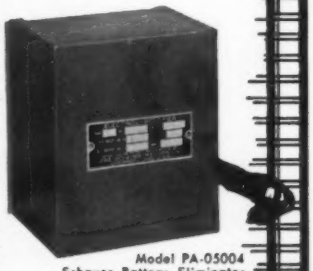

Model PA-05004
Schauer Battery Eliminator

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Schauer Type PA-05004 Battery Eliminator delivers constant, hum-free direct current to the operator's circuit. Equipped with relay for automatically transferring power to stand-by dry cells in the event of AC failure. Standard capacity is 4 volts DC at 0.5 amps. Steel case, for wall mounting is 5½"x6¼"x4".

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1957, the program is scheduled for completion in 1961 at an estimated cost of 13 million dollars.

Long distance facilities and local services in various provincial areas have been increased three to six times. The company has long distance connections with 187 towns and villages.

Work on the installation of dial exchange systems for Chiclayo, Huancavo and Piura is underway and new lines are being installed to Tingo Maria, Pucallpa and Tumbes.

•

In Brazil, several financiers are organizing a company to provide telephone service in the principal towns of the state of Para.

The first towns to be benefited are Obidos, Monte Alegre and Alenquer, all in the lower Amazon area. The initial investment will amount to approximately $42,000. Two hundred dial telephones are to be installed in Capanema.

•

In Chile, a long distance relay line between Santiago and southern Chile has been put into service. The 92 circuits are said to double the speed of communications between the capital and Concepcion and Chillan. Repeater stations were installed at San Bernardo, San Fernando and Parral.

A microwave system between Santiago and Valparaiso is expected to be in operation during 1961.

•

Off shore, the St. Vincent Telephone System, St. Vincent, British West Indies, is to be converted to dial service. The system is owned and operated by the St. Vincent government.

Enquist AE Representative For Government Sales

Oliver E. Enquist Jr. has been named an engineering representative for the government sales division of Automatic Electric Sales Corp.

In his newly created position, Mr. Enquist will be responsible for providing communications products engineering service for the company's military sales operations in lower California, Arizona, and New Mexico. His headquarters will be in Los Angeles, Cal.

He served as a U. S. Air Force chief warrant officer in communications and electronics activities prior to joining the company.

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"Nothing really succeeds which is not based on reality; sham, in a large sense, is never successful . . ."—WHIPPLE.

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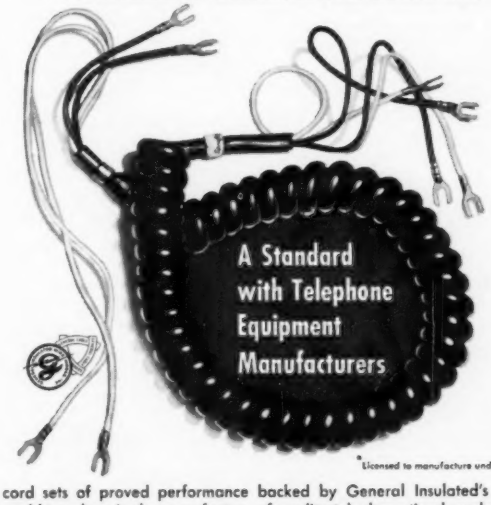

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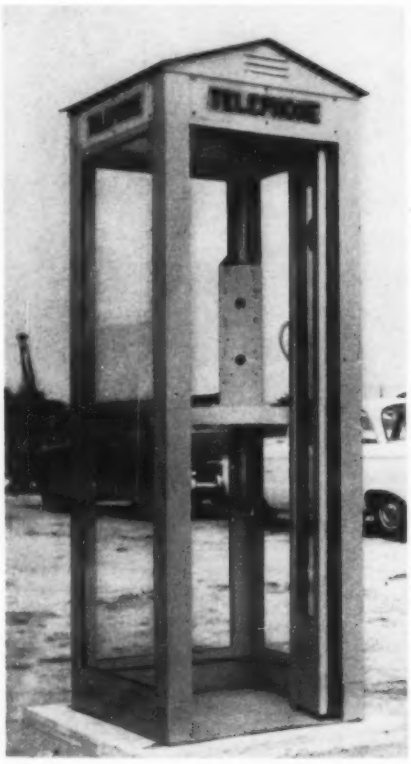

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Heat Coils. 76A, new . . . . . 10¢
Frames, MDF, W.E. & Cook
6 & 8 ft., single or up to 5 verticals in unit—save over half.
FUSES, 35A, B, C, H, S, New, 10¢. ($9 hund., $80 thousand) 75,000 in stock (standard W.E. pack, 10 or 50)

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Also may be used for ring-thru LB cord circuits, isolation, drainage.
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W.E. F-10, 5½ ft. stub . . . . . $ 6
12 ft. stub 7
F-16, 5½ ft. stub 10
12 ft. stub 12
F-26, 5½ ft. stub (4 for $50) ea. 15
BD-102, cross-conn 51 pr. or terminal 102 pr. 80
BD-606, as above 250
B26, with Cook #105 fused 20 pair protector 30
Cook XB11 with 6 ft. stub 6

A.E. 60A type, 16 pr., 6' stub . . $ 8
26 pr., 6' stub 12

Protected Pole Terminals.

11 pair S-6 Cook, A9—5 amp. Fuses—Tru-gap Dischargers. No stub, for Plastic cable, compression gland. New $19.50

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with protection 30
LA 51, complete 100
LB 26, fuse chamber only 20
with protection 30
LC 16, complete 45
LC 26, complete 60
LC 51, complete 80

Interior, lead stub

W.E. G-16, bind post chamb. 5
G-26, bind post chamb. . . . 10
H-51, bind post chamb. . . . 20
(12 ft. stub)
E-51, 54" stub 25
50 ft. stub 40

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WXB, 6 pr. (less box) Lead 4
WXB, 16 pr. (with box) 8
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Two 110 Volt Rectifiers for Charging Battery, operated on 24 Volt DC System.

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It was in 1949 that Bill joined the General Telephone Directory Company as a sales representative in our Long Beach Division. In 1955 he was promoted to Sales Supervisor.

Bill makes his home in Long Beach with his wife and three children. Over the years he has devoted his time and talents to the Community Chest and the Toastmasters Club.

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